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THE IRON AGE

JANUARY 6, 1927

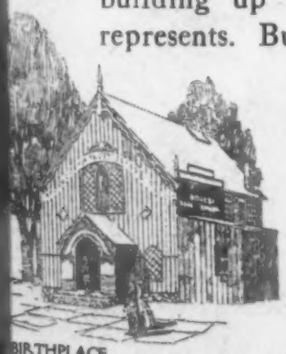
An Intimate Word

From a small beginning at Middletown, N. Y., in 1855, THE IRON AGE has grown to its present stature as the output of iron and steel and of all their widely ramifying products has grown.

The development has been a typically American one, in which THE IRON AGE and its thousands of friends have a right to take pride.

Never have the publishers forgotten that the prestige of their paper is due quite as much to the splendid constituency that has read it and had faith in it through all its 71 years as to those directly responsible for its conduct.

Its editors have had no small conception of the part they should bear in building up the great industries it represents. But always they have said that what THE IRON AGE has accomplished has been to a large extent a reflex of the character and the genius of the men who have built their lives into those industries.



BIRTHPLACE
HE IRON AGE
65

Much the same idea is in the minds of those whose habit is to think of THE IRON AGE as an Institution.

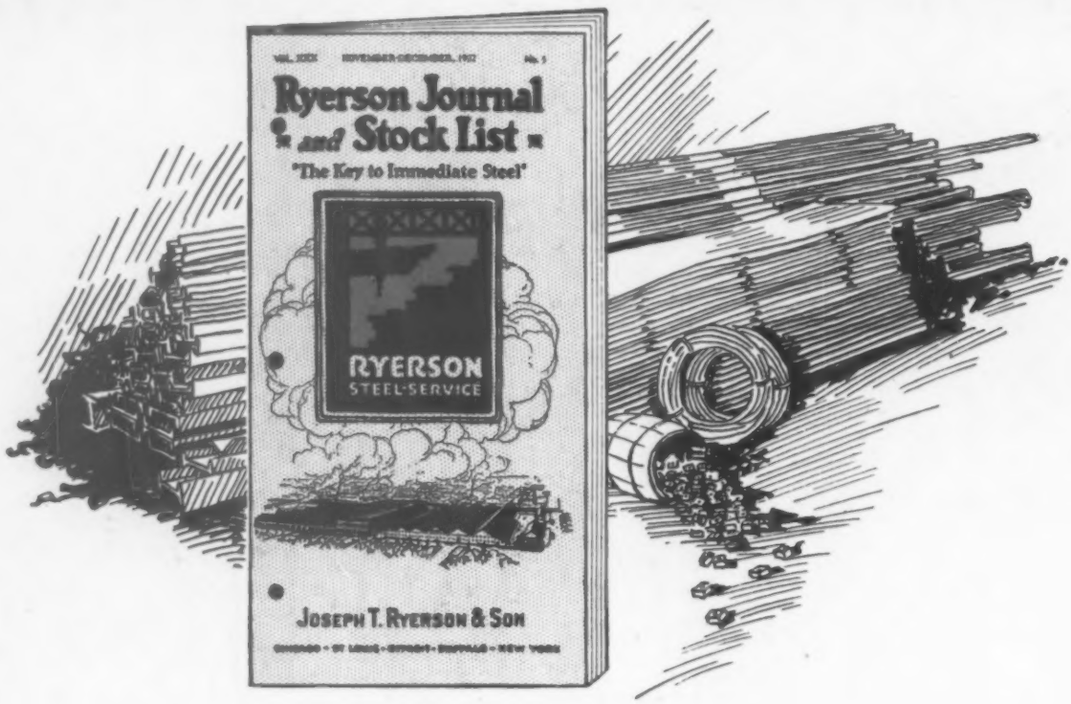
For years it has been identified in the public thought with the commanding position of the metal trades in our industrial life. It has never so striven to justify that opinion as in the years since the World War. Its editorial pages have been never more commended, its outlay for editorial features has been never so great, and the proofs of its influence within and without its special fields never so convincing.

Its editorial independence is an honorable tradition, as is its impartial handling of market questions involving sellers and producers on the one hand, and on the other hand buyers and manufacturing consumers.

If comment on this last statement is asked for, let it be found in the millions of tons of iron and steel that have been bought and sold on THE IRON AGE'S quotations.

From its first press day in the little print shop at Middletown, THE IRON AGE'S one aim has been to serve to its full power, without bias or favor, the whole army of American makers and users of the world's basic metals.

The confidence it has had in return has been a challenge to greater effort and a constant spur to enthusiasm and enterprise.



Ryerson Stock List— Guide to all Steel Products

IN this annual issue we would like to show all of the hundred and one steel and allied products carried in stock for immediate shipment.

As this is quite impossible we urge you to use the Ryerson Journal and Stock List.

If by chance you do not have a copy, write at once.

Bars	Plates	Boiler Tubes and Fittings
Shapes	Sheets	Reinforcing Steel
Structurals	Rivets	Firmtread Plates
Rails	Bolts	Alloy Steel
Shafting	Wire	Tool Steel
Strip Steel	Chain	Small Tools
Turnbuckles	Forging Bars	Machinery, etc.
Babbitt	Billets	

JOSEPH T. RYERSON & SON INC.
ESTABLISHED 1842

PLANTS: CHICAGO ST. LOUIS CLEVELAND NEW YORK
MILWAUKEE CINCINNATI DETROIT BUFFALO BOSTON

REPRESENTATION IN: DENVER LOUISVILLE SAN FRANCISCO JERSEY CITY
MINNEAPOLIS TULSA HOUSTON LOS ANGELES NEWARK

RYERSON STEEL-SERVICE

THE IRON AGE

New York, January 6, 1927

ESTABLISHED 1855 VOL. 119, No. 1

New High Peak in American Steel

A Year of Unexpected Expansion, With Downward Trend at Its Close—Prices Unusually Steady—Large Outputs to Get Costs Down

¶ *In* 1926 *the American steel industry far exceeded itself, producing over* 47,000,000 *gross tons of steel ingots, against a previous high record of* 44,140,000 *tons in* 1925.

¶ *To an extent without precedent steel companies pushed their plants for large outputs. In view of its enormous cost, new construction was kept down and efficiency of present plant constantly raised.*

¶ *With this pressure everywhere for high tonnage to reduce cost, steel supply was more than ample. The stability of prices through the year was remarkable, in view of what even one aggressive seller might have done.*

¶ THE IRON AGE *composite price for finished steel (seven leading products) was highest at* 2.453c. *both at the beginning and the end of the year. The low was* 2.403c. *in May. The year's average,* 2.439c., *was* 0.026c. *per lb. or* 52c. *per net ton below that of* 1925.

¶ *The hard situation of merchant blast furnaces in* 1925 *was made harder last year, partly because of increased imports. Total pig iron output was about* 39,500,000 *tons; in* 1925 *it was* 36,700,566 *tons.*

AS it enters 1927 the steel trade looks for continued large-scale activity, though its expectations are not so high-pitched as at the beginning of 1926. Two years of record-breaking production are behind it. Nineteen twenty-five was a 22 per cent greater year than 1924, and 1926 piled 3,000,000 tons of steel ingots (a 7 per cent increase) on top of the 44,000,000 tons of 1925. Profits in 1926, in view of the unprecedented volume of business, exceeded those for 1925. Only through larger tonnage was this possible, as the price average was slightly less than in 1925.

Both 1925 and 1924 ended with the production curve ascending. Since October, 1926, the trend has been moderately downward.

One year ago the high rate at which buyers took shipments from the mills in December was a matter of comment. In the December just ended the movement of steel into consumption has been somewhat less than that of November and the carrying over of the December rate into January is more likely than such an increase as was seen in January of last year.

A Conservative View of 1927

These differences in year-end conditions are noted, not as giving a definite basis for forecasting 1927 as a steel year, but as a reflex of the more conservative attitude of both producers and consumers, due largely to recent signs of slackening in new construction and the building of automobiles.

In all the business forecasts of the past week there has been recognition of the slight slowing of the pace already noticed in some industries, and of the probability that in volume 1927 will be somewhat less of a year than 1926. But almost without exception there is the accompanying opinion that no important recession is likely. Steel manufacturers were willing to believe a year ago that the great wave of new construction might lose some of its crest in 1926, with no serious hurt to their industry. They have the same thought now about 1927; and their expectations of the automobile in-

dustry are not so high as at this time a year ago. But railroad consumption is likely to be more this year than in either 1926 or 1925. These three key lines took 57 per cent of the rolled steel of last year; and from present indications all will give a good account of themselves in the year just ahead.

A Year of High Efficiency

As indicated in the italicized paragraphs at the head of this article, the peak reached last year in production and consumption of steel showed none of the phases of a boom, though not very many years back any such expansion of the industry would have been so called. The outstanding feature of the year was the cumulative effect of the production economies that were started in 1924 and that began to function so well in 1925. In other words, throughout the steel industry there was the same sort of efficiency that the railroads have been applying with such good results.

This was the steel industry's response to a growing agitation by its leaders for a better merchandising of its product. Many of them admitted that efforts to reduce production costs had been more successful than efforts to get better prices in the market. In its front cover message of Jan. 7, 1926, THE IRON AGE said:

"In 1925 our steel companies gained high plant efficiency. Will they have enough vision and restraint to make 1926 memorable in like degree as a year of enlightened selling?"

At times in the past year it has seemed that sellers of steel have shown more willingness to refuse business that did not yield a profit. Buyers of rolled products have agreed that they would be helped in their efforts to get a fair profit on their own products if the steel industry could improve its selling practice. Bolt and nut manufacturers in particular have been active propagandists for better selling of steel as an aid in stabilizing the products of consuming industries.

On the whole, the agitation for more successful salesmanship in steel has been bearing fruit. With an outpouring of 3,000,000 tons more of steel last year than in 1925 some stabilizing influences have evidently been at work, seeing that the average of the prices of seven leading finished products was only 50c. a ton less than in 1925. But for the better marketing, such financial results as the leading steel companies achieved last year would have required even a greater advance beyond the operating efficiencies of 1925.

Unusual Fuel Features

Both the anthracite strike, which ran for six weeks after 1926 came in, and the British coal strike, which began on May 1 and did not end until Nov. 30, had their repercussions in the American iron trade. Time was when such a fuel situation as last year's would have thrown both pig iron and steel markets into confusion, but our integrated steel industry of today is little affected by what happens in merchant fuel.

The anthracite strike produced unusual prices for soft coal and coke for use in house heating, as high as $13 and $14 a ton being paid. Some large steel companies kept the advance from going farther by increasing their coke output and marketing a goodly tonnage in domestic sizes. These companies maintained a fixed price on such coke for household use and very commendably regulated the wholesalers' price to retailers. Merchant pig iron producers in some cases banked their furnaces and sold their coke in the market, making a far better profit than pig iron could yield.

Large exports of American coal were made during the British coal strike, and in October there was spectacular activity in coal in the Pittsburgh district, as high as $4 being paid. Spot furnace coke sold at $4.50 at ovens, and there was the possibility that pig iron prices would be affected. The situation changed rapidly, however, in early November, when the collapse of the British strike was seen, and in the end the flurry in coal exports was not a factor in the pig iron market.

Output Curve Showed Much Less Fluctuation Than Usual

The 1926 curve of steel ingot output by months, as given on page 3, is in contrast with those for the seven years preceding, in that the fluctuations are less pronounced. The high point in production, as in 1924 and 1925, was reached in March, when there was a 92.5 per cent operation based on 56,000,000 tons a year as the country's theoretical capacity. What was widely commented on in the industry was the absence of the deep dip in the production curve which has commonly come in the summer months, and which was especially pronounced in 1921 and 1924.

The year's steel ingot output is estimated at 47,000,000 gross tons and that of steel castings at 1,250,000 tons (against 1,252,786 tons in 1925), making the total of ingots and steel castings about 48,250,000 tons, compared with 45,360,000 tons in 1925.

Below are given for comparison the outputs of pig iron and steel ingots, with total ingots and steel castings in 1926 and the preceding 10 years, covering the high-production war years and those following:

	Pig Iron, Gross Tons	Steel Ingots, Gross Tons	Steel Ingots and Castings, Gross Tons
1916	39,434,797	41,401,917	42,773,680
1917	38,621,216	43,619,200	45,060,607
1918	39,054,644	43,051,022	44,462,432
1919	31,015,364	33,694,795	34,671,232
1920	36,925,987	40,881,392	42,132,934
1921	16,688,126	19,224,084	19,783,797
1922	27,219,904	34,568,418	35,602,926
1923	40,361,146	43,485,665	44,943,696
1924	31,405,790	36,811,157	37,931,939
1925	36,700,566	44,140,738	45,393,524
1926	39,500,000	47,000,000	48,250,000

The variations in the average daily rate of steel ingot production, month by month in 1926, as shown in the statistics of the American Iron and Steel Institute, were as follows:

Months 1926	Daily Production, Gross Tons	Months 1926	Daily Production, Gross Tons
January	159,633	July	140,425
February	158,407	August	154,022
March	166,236	September	151,180
April	158,613	October	157,406
May	151,744	November	143,158
June	144,256	December	.....

PIG IRON OUTPUT NEXT TO HIGHEST

Last year's pig iron production was probably next to the highest on record, which was 40,361,146 gross tons in 1923. We estimate the 1926 production (including charcoal iron, of which statistics are not collected monthly) at 39,500,000 tons, which is not much above the 39,434,797 tons of 1916. In 1925 the country made 36,700,566 tons, so that the increase last year was about 2,800,000 tons.

In the table below are given the number and capacity of furnaces in blast at the beginning of each month. The largest number was 237 on May 1, with a daily capacity of 115,150 tons, and the smallest, 213, on Dec. 1 and Sept. 1:

1926	No. in Blast	Daily Capacity, Gross Tons	1926	No. in Blast	Daily Capacity, Gross Tons
Jan. 1	234	107,560	July 1	220	106,140
Feb. 1	224	104,065	Aug. 1	216	103,245
March 1	226	104,800	Sept. 1	213	102,085
April 1	238	114,000	Oct. 1	216	105,480
May 1	237	115,150	Nov. 1	219	108,760
June 1	228	110,600	Dec. 1	213	105,850

Both Exports and Imports Increase

Much better progress was made in 1926 than for several years in placing American iron and steel in foreign markets. While in 1925 our exports were decreasing, 1926 made a better showing than any year since 1921. Figures for 11 months indicate a total for

the year of approximately 2,150,000 tons, against 1,762,572 tons for 1925 and 1,807,157 tons for 1924. Month by month from 1921 through November, 1926, the figures are shown in the table. In the first 11 months of the year our rail exports were 168,000 tons, a gain of 21,000 upon those for the like period of 1925; steel bars were 127,000 tons, a gain of 25,000 tons; galvanized sheets were 162,000 tons, a gain of 14,000 tons; tin plate was 219,000 tons, a gain of 71,000 tons. Some of the gains, particularly tin plate, were due to the crippling of British steel production by the coal strike.

While exports have thus shown a gain well over 20 per cent from last year, imports have increased at about the same rate, reaching a total higher than that for any previous calendar year since 1903. For 11 months the aggregate was 1,035,531 tons, indicating a probable total for the year of 1,125,000 tons. This compares with total imports in 1925 of 943,085 tons and for 1924 of 556,814 tons. Due to Europe's depreciated currencies, low labor costs, and the gradual restoration of her steel industry, our imports have been at a considerably higher rate since 1924 than has been seen in many years.

Where the Chief Exports Went

As in other years, Canada was the largest buyer of steel from the United States, taking more than 39 per cent of our total shipments, against nearly 40 per cent in 1925. Japan, which long has ranked second in purchases of our products, took about 11.5 per cent last year, after having fallen to third position in 1925. In the six years following the war Japan took much more, the average being nearly 27 per cent of our total exports. But Japan now has sheet mills, and the sheet item was rather large in our total before. Mexico, Cuba, Colombia, Great Britain, Venezuela, Chile, Argentina, Philippine Islands and Brazil follow, in that order, in their proportion of our exports in 1926.

Japan took one-sixth of our rail exports in 1926, one-fifth of our tin plate and one-half of our black sheets. Canada took four-fifths of our steel plate shipments, one-fourth of our galvanized sheets, two-fifths of our black steel sheets, three-fifths of our steel bars, one-fifth of our tin plate, nearly one-sixth of our rails, more than one-third of our wire, and about three-fourths of our structural shapes. Both Brazil and Cuba bought heavily of steel rails.

Rolled and finished steel in the year just past accounted for about 84 per cent of our total exports. In the case of imports, rolled and finished steel were 36 per cent of the total. More than 41 per cent was pig iron. Scrap accounted for 8 per cent, ferroalloys for nearly 5 per cent and cast iron pipe for 7 per cent.

Machinery exports for the year will aggregate close to $400,000,000, against a total in 1925 of $385,000,000 and $317,000,000 in 1924. Gains last year were largely in agricultural implements, mining, quarrying and oil-well machinery, and elevating equipment. Imports of machinery during the year will show a total of about $17,300,000, or 50 per cent more than in 1925.

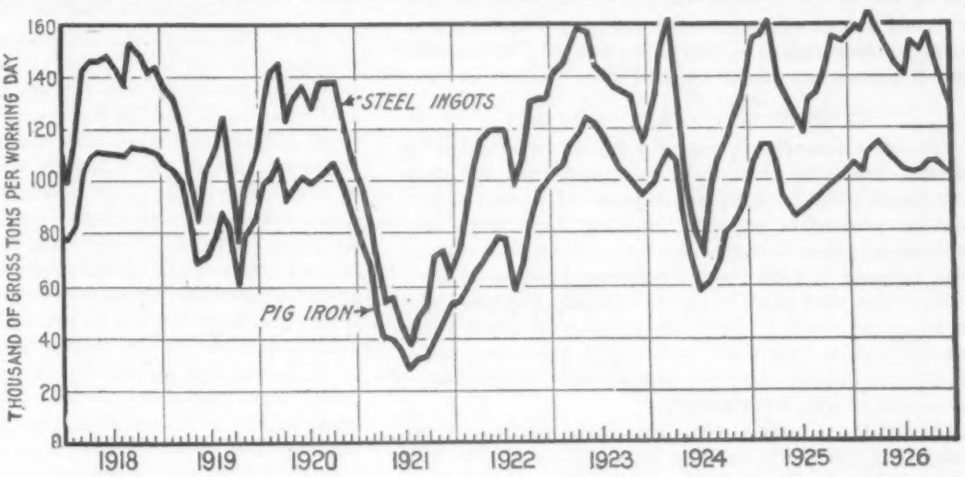
Sources of Our Imports

Germany sent us in the first 11 months of 1926 about 250,000 tons of iron and steel products. Belgium came second, with nearly 213,000 tons, while United Kingdom and France were close together at about 123,000 tons each. Imports from Great Britain after May averaged only about one-third the rate of the first five months. Almost 60 per cent of the German tonnage consisted of pig iron, while practically 75 per cent of imports from the United Kingdom was pig iron. In the case of France, pig iron was less than one-fourth the total, and with Belgium less than 4 per cent.

India, shipping us 81,578 tons of pig iron, was in third position in that commodity, behind Germany and United Kingdom. Netherlands came fourth, with about 65,000 tons. Total pig iron imports in 11 months of 1926 (430,819 tons) came within 3 per cent of the year's total for 1925, and the movement was double that of 1924.

Cast iron pipe imports in 11 months were 71,779 tons, against a 12-month total of 51,215 tons in the preceding year, and 46,900 tons in 1924. France led in all three years, sending about 68 per cent of the total in 1926, 83 per cent in 1925, and nearly 49 per cent in 1924, in which year Belgium sent practically the same tonnage as France. Belgium was second in each year.

Other considerable items of imports included 111,000 tons of structural shapes in 11 months, mostly from Belgium; 98,000 tons of steel bars, again more than half from Belgium; and 62,000 tons of rails, in which Belgium's share was the largest. Germany increased in structural shapes from 3100 tons to nearly 20,000



FLUCTUATIONS in Daily Average Production of Steel Ingots and Pig Iron in the Past Nine Years. The general parallelism has been less marked in the past year. The curves are based on the monthly ingot figures of the American Iron and Steel Institute and the monthly pig iron figures of THE IRON AGE. Both curves tended downward in the closing months of 1926.

United States Exports of Iron and Steel, Gross Tons

	1921	1922	1923	1924	1925	1926
Jan.	547,394	160,920	123,190	247,942	141,777	174,585
Feb.	393,328	133,975	133,902	164,820	102,299	157,187
Mar.	230,635	208,843	163,920	123,618	155,384	169,438
Apr.	162,592	198,830	177,471	131,276	155,375	194,449
May	142,551	230,062	203,389	154,136	150,612	173,418
June	119,081	212,295	171,183	163,770	136,847	159,506
July	86,523	157,169	168,558	137,481	139,861	194,717
Aug.	75,827	145,640	161,426	134,628	188,465	171,588
Sept.	95,169	129,475	172,499	135,979	136,791	182,071
Oct.	106,582	132,924	152,511	157,071	141,817	172,070
Nov.	132,290	127,782	186,956	123,577	171,134	219,830
Dec.	134,415	150,170	177,844	128,865	142,209	.....
	2,213,042	1,988,085	1,992,849	1,803,163	1,762,571	2,150,000*

*Estimated.

tons, in steel bars from 3100 tons to nearly 15,000 tons, and in steel rails from 4300 tons to nearly 23,000 tons.

Changes in Consumption from 1925

It is not easy to make an exact appraisal of the flow of steel into the various lines of consumption in a given year. Yet THE IRON AGE has been able to get more complete data for 1926 than have yet been given since the first adequate presentation of steel distribution was made in these columns, in our issue of Jan. 4, 1923.

The columnar showing for 1926 on page 6 is probably the best picture thus far presented at the beginning of any year, of what the steel industry did in the twelve-month preceding.

It is common to consider railroad equipment, new construction and automobile demand as determining the place of any year as a user of steel. As in 1925 all three made large drafts upon the steel industry last year. Yet 1926 would not have been distinctly the peak year had it not been marked by a wholly unprecedented demand for oil and gas line pipe, by expansion in the use of sheets for a great variety of purposes, and by a record output of the canning industry which made a corresponding record in tin plate, not only in tonnage but in percentage of the finished steel total.

UNPRECEDENTED PIPE CONSUMPTION

It was a remarkable year for the manufacturers of tubular products. But it is estimated that the past few years have brought an increase of about 30 per cent in productive capacity, so that there were idle mills at all times through the year. There was a further advance in 1926 toward seamless tubes to replace welded pipe, and more seamless capacity is under construction or planned. With the advance of the art the cost of seamless tubes will be brought down, and while 13 in. is ordinarily the limit of size today, larger diameters will shortly be available.

Probably no single year has been marked by so many large contracts for line pipe. These include 200 miles of 8-in. for Magnolia Pipe Line, 100 miles of 4-in. for Continental Oil Co., 165 miles of 22-in. for the Standard Oil Co. of New Jersey, 100 miles of 8-in. for Humble Oil Co., 200 miles of 8-in. for Roxana Petroleum Co., 100 miles of 12¾-in. for Lone Star Gas, 10 miles of 16-in. for Upham Gas Co., 300 miles of 10-in. repeat order for National Andean Corporation, 200 miles of 8-in. for Prairie Oil & Gas Co., 160 miles of 22-in. for Philadelphia Co. and the more recent 800-mile order of Gulf, Humble and Magnolia companies for 10-in. and 12-in. pipe. Here is a total of 2425 miles.

CAR ORDERS LESS THAN IN 1925

No year since 1913 has seen such a large demand from the railroads for track and track fastenings. In standard section rails the 1926 output was about 2,950,000 tons, against 2,621,000 tons in 1925.

Freight cars ordered in 1926 for steam railroad use totaled 51,805; in addition to which railroad companies built close to 10,000 cars in their own shops. Other types such as logging cars, ore cars, etc., not included in car builders' estimates, bring the total of all cars ordered to about 67,000. This compares with 78,000 ordered in 1925 and 135,000 in 1924. During last year 79,000 cars were built and delivered by car companies, while in the previous year 94,000 were delivered and 104,000 in 1924.

Only 1301 locomotives were ordered for domestic service, this being the smallest number in 12 years with the exception of 1925 and the subnormal years 1919 and 1921. Locomotive shops built and shipped 1585 engines.

The year was notably active in point of construction of new railroad mileage, new lines exceeding 1000 miles for the first time since 1916. A similar program of extension is contemplated for this year.

As an automobile year the detailed statements elsewhere show that 1926 exceeded 1925, though by no considerable margin. An estimate of cars and trucks for the United States is 4,293,000, as against 4,175,000 in 1925.

Steadiness in Prices

The price curve for finished steel had fewer fluctuations last year than in 1925, both producers and consumers having made a better adjustment to the buying-for-consumption regime. Also, there was nothing corresponding to the general effort of the industry to get on higher ground that came just after the election of 1924. On plates, shapes and bars the evenness of the year's market was conspicuous. While several attempts were made to put bars and shapes at 2c., Pittsburgh, as a minimum, there was so much entering of tonnage at 1.90c. previous to the announcements of advances, that the latter was for the most part the prevailing price of the year to larger buyers.

NEW PRICE SCHEME IN SHEETS

As in 1925, there was evidence of highly competitive conditions in the sheet industry, but an important development last year was the adoption on Sept. 1 of a new gage base, No. 24 being substituted for No. 28. Gage differentials were also changed, being increased on gages lighter than No. 24 and reduced on those heavier. The intent of the change was to bring market prices for the different gages into better alinement with mill costs. The old differentials, it was held, lent themselves to the naming of low prices on the heavier gages, by manufacturers who did not make the full range of gages, and then the low prices had a way of transferring themselves to the lighter gages.

It does not yet appear to what extent the sheet producers have gained by the new base and new differentials, though it is conceded that the new regime is an improvement which should prove equitable to all concerned. There was heavy covering in all gages before the change became effective, so that the $2 a ton advance made in October (designed to put No. 24 gage at 3.10c. instead of 3c. per lb.) has not yet affected many buyers.

In the strip steel market there were evidences throughout the year of the abundant capacity for production, efforts at stabilization being only temporarily successful. Cold rolled strip mills operated throughout the year under sharply competitive conditions.

PIG IRON AND FINISHED STEEL IN CONTRAST

The diagram (opposite page) of THE IRON AGE composite prices for finished steel and pig iron shows an even more marked difference in the course of the two than was seen in 1925. The fluctuations in finished steel made little departure from the horizontal and no year since the war has shown so small a swing. Pig iron was highest at the beginning of the year at $21.79. The decline following January continued into fall, August and September registering low at $19.46. The fuel situation, due to large coal exports during the British strike caused an advance to as high as $20.13 in November, with a decline later to $19.88 in the final week of the year.

Better Earnings Than in 1925

Profits of most of the large steel companies were considerably better than in 1925, but as indicated above this was due rather to the larger output and greater success in reducing unit cost than to betterment in the average of all prices. The year was made notable in Steel Corporation annals by the action of the directors on Dec. 16 in asking the stockholders to vote a 40 per cent common stock dividend at the annual meeting in

April. Some such distribution of stock by capitalization of a part of the $521,863,000 of undivided surplus (as of Dec. 31, 1925) has long been discussed. The action just taken does not mean that 1926 was so rich a year as to warrant a stock dividend, nor that 1927 has such prosperity in store that the present is a good time to make an extra distribution. It rather signifies the belief of the directors that the action is justified, at this time, after 25 years of building up a surplus, by the "property conditions and earning capacity of the corporation."

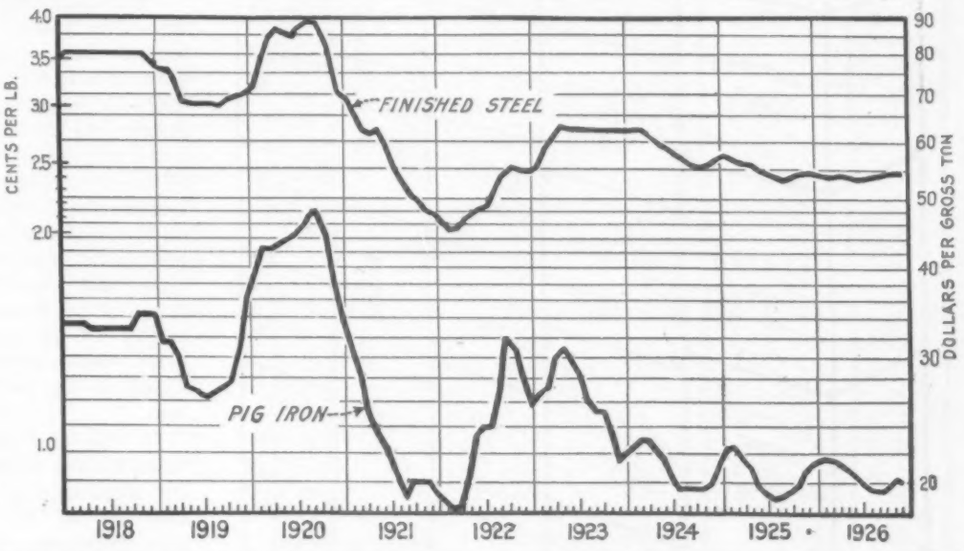
Lest public opinion may err as to the profits of the steel industry as a whole it should be recorded again that the Steel Corporation's ownership of ore and other railroads and of a large lake fleet, its production of cement and various other by-products give it $3 or $4 a ton larger earnings than are possible to various of its competitors.

Net profits of the Youngstown Sheet & Tube Co. for the first nine months of 1926 totaled $11,994,093, as compared with $10,419,897 earned in the same months of 1925, being more than twice the earnings of the same period in 1924. Variations between the quarters were less than $400,000.

In the first three quarters of the year the Inland Steel Co. earned $5,034,519, as compared with $3,448,619 in the first nine months of 1925. The largest gains were shown in the second and third quarters, which together showed a larger profit than was realized in the three quarters of the preceding year.

Another Difficult Year in Pig Iron

Pig iron developments last year repeated and accentuated those of 1925. There was high production, a low level of prices—the lowest, in fact, in ten years—and keen competition. This was most severe in the



FLUCTUATIONS Over Post-War Years in THE IRON AGE Composite Prices of Pig Iron and Finished Steel. The rolled steel composite is the average of market prices of steel bars, beams, tank plates, plain wire, open-hearth steel rails, black pipe and black sheets. The stability of finished steel prices in comparison with those of pig iron is emphasized in the curves for the past three years, and is more marked in 1926 than in any other year represented. Since the peak of the first quarter in 1923, the trend of both lines has been downward.

STEEL CORPORATION EARNS $5 ON COMMON STOCK IN THIRD QUARTER

Earnings of the Steel Corporation during the first nine months of 1926 were more than $22,500,000 in excess of the figure for the corresponding period of 1925, and the year's total may prove to be 20 per cent higher than that of 1925. Earnings for the last three years by quarters were as follows:

Quarter	1926	1925	1924
First	$45,061,285	$39,882,992	$50,075,445
Second	47,814,105	40,624,220	41,381,039
Third	52,626,826	42,400,419	30,718,415
Fourth	.....	42,630,840	30,939,912

The amount available for common stock dividends during the first quarter was $3.89 per share; for the second quarter, $4.20, and for the third quarter, $5. The total for the three quarters, $13.09, compares with $9.44 for the first nine months of last year.

Bethlehem Steel Corporation earnings for the first three quarters of 1926 were well in excess of those in the preceding year. The three quarters showed respectively $5,865,850, $5,348,023 and $4,550,978, or a total of $15,764,851 against only $13,858,196 for all the four quarters of 1925.

The Republic Iron & Steel Co. earned approximately $1,250,000 more in the first three quarters of last year than in the same period of 1925—a total of $3,755,548 against $2,499,326. The company resumed dividend payments on its common stock at a 4 per cent rate, after having passed them continuously since 1921. Profits available for dividends on common stock during the first nine months were at the rate of $11.66 per share on the 300,000 shares outstanding.

East because of increased imports and the completion of two modern merchant blast furnaces in that district.

With December estimated, the pig iron output for the year was about 39,500,000 gross tons, the largest in the history of the industry apart from 1923, when 40,361,146 tons was produced.

Pig iron prices were the lowest since 1916, THE IRON AGE composite price for the year averaging $20.42 against $20.58 in 1925 and $20.90 in 1924. A five-year average, 1922 to 1926 inclusive, was $22.45, or $2.03 above that for 1926.

The very large production goes far toward explaining the low prices throughout the year. Consumption was also at a high rate, but there was at all times a surplus of iron which gave the buyer the advantage.

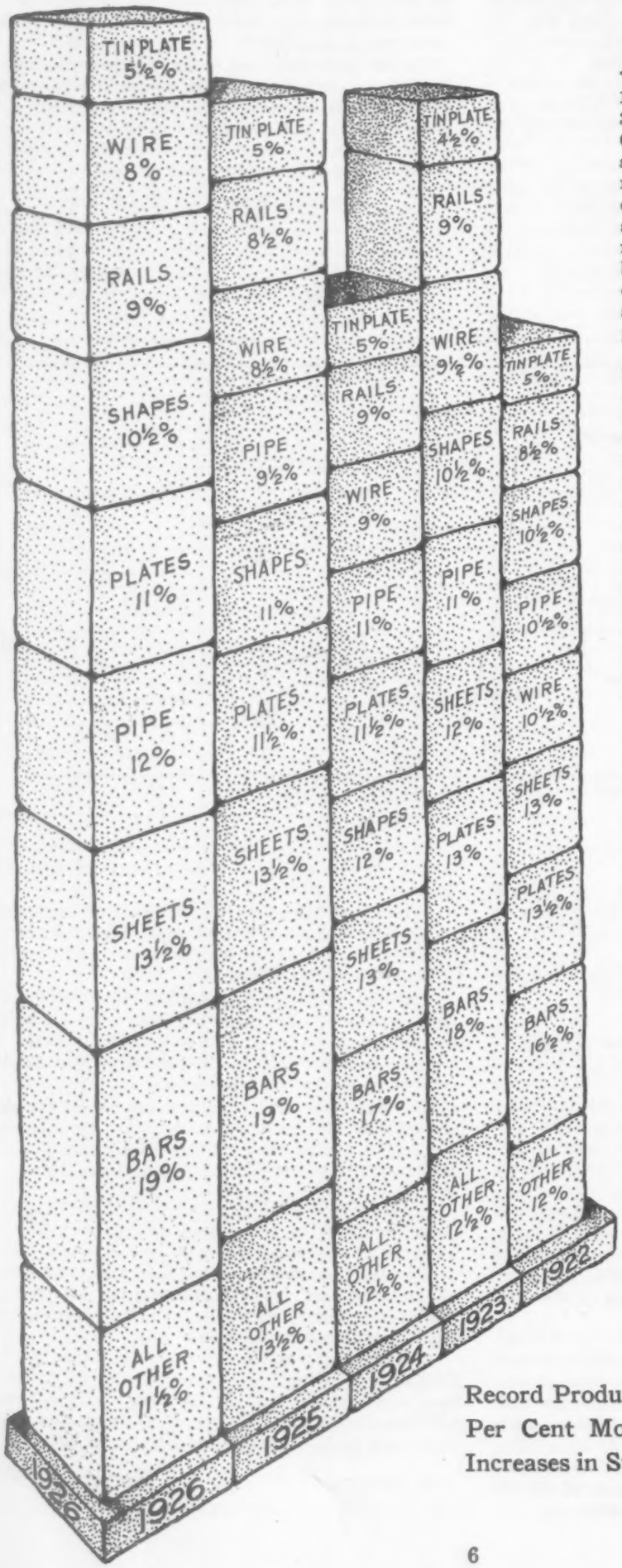
EASTERN COMPETITION ESPECIALLY SEVERE

In the East the competitive situation was aggravated, as in the year before, by large imports. The total brought in, with December estimated, was about 450,000 gross tons, much of this coming to Atlantic Coast ports, thereby restricting sales by domestic furnaces in the Eastern territory.

Completion of two new merchant blast furnaces in the East, one at Troy, N. Y., and the other at Everett, Mass., made available nearly 1000 tons additional iron daily for the Eastern market, particularly New England, and made a sharply competitive situation be-

(*Concluded on page* 95)

What Steel Was Made and Where



ABOUT 6.5 per cent more finished steel was shipped from American mills last year than in 1925. The approximate showing is 34,782,000 gross tons, against 32,660,000 tons for the preceding year. Outstanding are the large production of rails and pipe and the expansion in demand from the oil industry. Not since 1913 have purchases of heavy rails been so large, and a new record by a wide margin is indicated in the output of pipe. Developments in oil and mining appear to have taken 25 per cent more steel than in 1925.

The estimates on production are based on returns from rolled steel makers that account for 32,425,000 tons, or over 93 per cent of the year's total—a percentage that is especially noteworthy, first, as affording another proof of the high spirit of cooperation of the steel industry in contributing confidential information for the common cause, and second, as providing a dependable set of figures for calculating the amounts of the different forms of steel made by the unrepresented 6.7 per cent of the country's active producers. For 1925 corresponding figures covered 85½ per cent.

A similarly better showing was made for the detailed classification of the shipments of steel to the main channels of consumption. Against such distribution figures for 65½ per cent of the output of 1925, the statistics for last year's movements were supplied for no less than 73.3 per cent. These 25,519,000 gross tons are reported in detail in the table on pages 8 and 9.

It is from this table that the percentage figures for the consumption by industries has been figured, as shown in diagram on page 7. It required an allocation of the tonnage shipped originally to jobbers and warehouses. This redistribution was determined by the help of a questionnaire sent to jobbers and by some acquaintance with the trade of jobbers in various communities. The 73.3 per cent of the output covered is not necessarily representative of the remaining 26.7 per cent. For example, some of the companies supplying figures to THE IRON AGE are predominantly purveyors to the railroads. Also, they

Record Production in Rolled Steel—6.5 Per Cent More Than in 1925—Chief Increases in Steel Rails and Pipe—Loss in Wire

It Went in Nineteen Twenty-six

supply a relatively large percentage of the consumption of the automotive industry. Thus, when estimates are made for the whole country, the relative railroad showing is reduced from that indicated in the table, and similarly the importance of building and construction is enhanced.

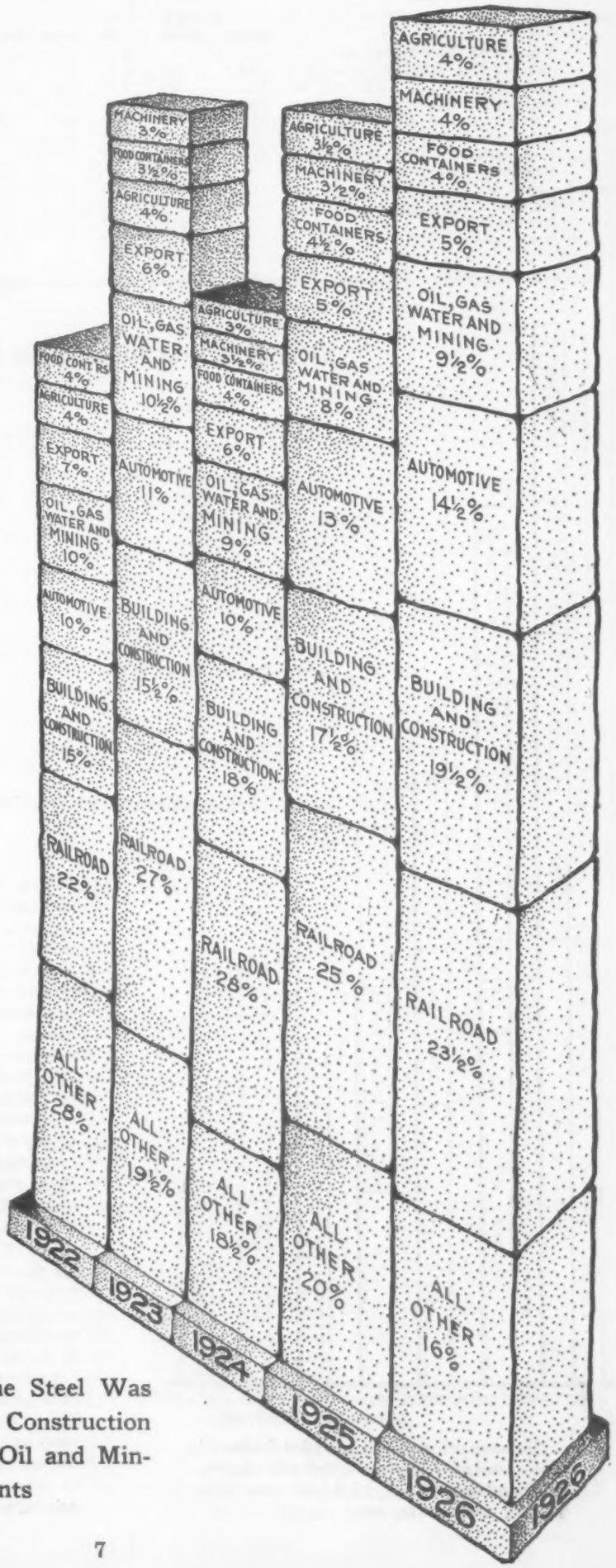
The table shows 22¾ per cent for the railroads, but this rises to 23½ when the steel distributed through warehouses is reallocated. Building is barely 13½ per cent in the table, but when given its share of jobber tonnage, particularly pipe, it rises to over 19 per cent. Further, exporting was a small factor with the non-reporting companies, and was about 5¼ per cent for all the country rather than the 6¼ per cent which the 1,597,000 tons of the table amount to.

An estimate of distribution for the whole output has been made but it is believed the table here given, carrying figures as supplied by the makers, will serve. Suffice it to say that 100 per cent allocation would give the railroads less than 22 per cent, buildings 19 per cent, automobiles under 14 per cent, oil and mining no less than 12 per cent, and so on.

The accompanying table gives the estimated amounts of steel produced last year. Allowance was made for companies not reporting, and for the steel converted from billets, slabs, sheet bars, wire rods and skelp sold by the principal makers to companies operating rolling mills and not necessarily making their own steel.

Estimated Production in 1926

	Gross Tons
Heavy rails	2,949,000
Light rails	180,000
Track accessories	1,076,000
Plates	3,833,000
Structural shapes	3,572,000
Steel bars	6,721,000
Strip, hoops, bands	1,836,000
Tin plate	1,874,000
Sheets	4,683,000
Pipe and tubes	4,129,000
Wire products	2,678,000
All other products	1,251,000
Total	34,782,000



Again Two-Thirds of the Steel Was Absorbed by Railroads, Construction Work, Automobiles and Oil and Mining Developments

Forms of Steel Different Industries Took in 1926, Showing Percentages Making Up to Total for Each Industry

	Rails	Track Accessories	Plates	Shapes	Bars	Sheets	Tin Plate	Wire Products	Pipes and Tubes	Hoops, Bands, Strips	All Other
Automotive (inc. trucks, etc)	..	..	5	1	43	24	..	3	..	15	9
Railroad (inc. cars and locomotives)	42	13.5	15.5	9	9	2.5	..	1	1	..	6.5
Agriculture	..	..	6	1.5	22	8.5	..	45	1	4	12
Buildings, bridges and other construction (not railroad)	..	..	11	40	17	7	..	5.5	14	2.5	3
Shipbuilding	..	..	53	21	15	1	..	1	..	..	9
Food containers	..	..	2	..	..	9.5	76	2	..	4.5	6
Machinery (elec., textile, machine tools, etc.)	..	..	9.5	8.5	55	8	..	5	..	2	12
Oil, gas, water, mining	5.5	..	23	5.5	6	5	1.5	3	47.5	1	2
Exports	10	2	9	9	8	14	19	6	12	1	10
Miscellaneous	..	..	8	4	18	21	5.5	14	7	7	15.5

Consumption by Important Industries. For example: Of railroad purchases, 9 per cent were bars, 15.5 per cent plates, 42 per cent rails, etc.

Distribution of Rolled Steel in 1926, According to Shipments of

Amount of Each Form Taken, in Thousands

	Heavy Rails	Light Rails	Track Accessories	Plates	Structural Shapes	Bars
Railroads (incl. frog, car and loco. co's.)	2,462.2	0.8	790.7	906.4	513.2	532.3
Fabricators and bldg. contractors	1.4	.8	.1	589.6	1,669.1	674.0
Auto. and parts mfrs.	....	....	....	176.8	37.7	1,526.4
Oil, gas and water co's	....	7.2	....	460.8	89.9	75.4
Mining and lumber co's	18.8	87.1	11.4	18.6	11.8	30.5
Agricultural equipment	.5	....	.1	44.7	11.8	171.1
Metal containers	....	....	....	21.3	1.4	5.6
Shipbuilding	....	....	....	118.0	46.5	33.3
Machinery and hand tools	1.1	1.4	.1	70.8	61.1	401.2
Jobbers and warehouses	25.6	5.5	11.9	153.3	337.7	497.6
Exports	188.5	6.8	24.5	146.7	154.0	136.7
Miscellaneous	17.8	5.3	11.5	271.0	129.8	582.1
Totals	2,715.9	114.9	850.3	2,976.0	3,064.0	4,666.2

One interesting showing is the large amount of steel distributed through warehouses, including steel company warehouses and those of the private jobbing trade. The table for the 73.3 per cent of the output gives a ratio of 11.8 per cent. As a matter of fact, returns from steel companies making 26,501,800 gross tons disposed of 3,122,600 tons of steel through warehouses. The percentage is lower for the whole steel industry, as some companies make little or no use of distributers. Pipe is, of course, the largest item jobbed. Of 2,424,800 tons for which detailed figures are available, 998,600 tons went through the hands of distributers, or 41 per cent.

Referring again to the absorption of steel by consuming industries, it is to be noted that the railroads, the building and construction industry, automobiles and oil, water, gas and mining developments took two-thirds of all the steel, as was the case the year previous for these same four avenues of consumption. The fact that they retained their percentage in the face of the substantially larger total steel output last year is due to an increased demand by the oil industry of apparently 25 per cent. Agriculture, the food packers and makers of machinery, each took about the same amount of steel when the jobber tonnage is distributed among them. Shipbuilding somewhat exceeded its usual 1 per cent and exports amounted to about 5¼ per cent, as stated.

As to forms of steel, the heavy demand for rails has been the factor holding railroad steel consumption

What Percentage of Each Form of Steel Was Distributed in 1926 Among the Industries

	Automotive	Railroads	Agriculture	Buildings and Const'n	Shipbuilding	Food and Other Containers	Machinery	Oil, Gas, Water and Mining	Exports	Miscellaneous
Rails	..	87	..	..	..	..	..	5½	6½	1
Track accessories	..	94.5	..	..	..	..	..	1.5	2.5	1.5
Plates	6.5	30	2	21	4.5	1	3	17	4	11
Shapes	2	18	1	59	2.5	..	3	4	4.5	6
Bars	30	11.5	9.5	17	1	..	10	2.5	2	16.5
Sheets	34	6	3.5	10	..	3.5	3	4.5	5.5	30
Tin plate	..	..	..	..	..	64	..	3	18	15
Wire products	7.5	4.5	25.5	14.5	1.5	1	6	3.5	4	32
Pipes and tubes	..	1.5	..	37.5	..	..	..	44	5	12
Hoops, bands, strips	50	2	4	10	..	5	2	2	1	24
All other	2	41	2	13.5	1.5	1	6.5	5	14	13.5

27 Companies Producing Over 73 Per Cent of the Year's Output

of Gross Tons, by Different Industries

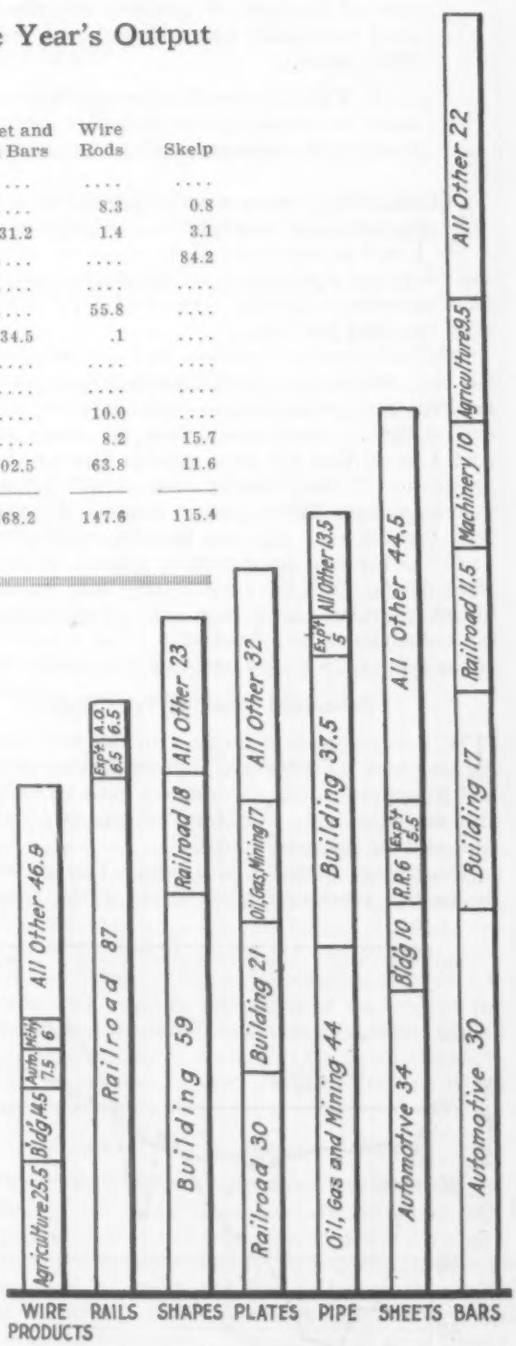
Hoops, Bands, Strips	Tin Plate	Sheets	Pipe and Tubes	Wire Products	All Other Finished	Billets and Slabs	Sheet and Tin Bars	Wire Rods	Skelp
13.8	....	138.1	33.7	52.5	294.2	80.0	....	....	....
86.8	....	179.2	18.2	123.1	94.6	17.4	....	8.3	0.8
513.7	....	841.3	11.1	109.8	7.9	183.8	131.2	1.4	3.1
14.4	37.4	95.1	914.9	31.4	26.4	33.8	....	....	84.2
5.6	....	5.8	4.5	15.8	4.2	.8	....	....	....
33.4	....	65.6	10.2	354.4	7.2	24.7	....	55.8	....
46.4	774.3	95.4	....	20.9	6.0	6.1	34.5	.1	....
.3	....	.9	1.7	2.7	3.9	14.0	....	....	....
17.4	....	58.3	....	37.2	30.5	57.1	....	....	....
82.8	17.1	275.2	998.6	473.2	83.6	18.6	....	10.0	....
21.8	312.5	236.3	195.8	102.6	45.9	1.2	....	8.2	15.7
222.4	176.2	685.2	236.1	464.1	80.3	213.0	102.5	63.8	11.6
1,058.8	1,317.5	2,676.4	2,424.8	1,787.7	684.7	650.5	268.2	147.6	115.4

close to the level of 1925, the 23½ per cent of the larger total output last year for all railroad takings being equal to the 25 per cent of 1925. The output of pipe was phenomenal, for which sustained building operations and the oil industry expansion were chiefly responsible. Substantially the only item showing a falling off was wire products, which declined 6 per cent from the 1925 output.

The table on the top of page 8 gives the relative amounts of different forms of steel taken by a given industry. A corresponding table, page 9, tells how each form is distributed among the industries. Diagrams accompany the tables. Rails comprised 42 per cent of the shipments to railroads, against 29½ per cent in 1925. Shapes again amounted to 40 per cent of the consumption of the building industry. The bar percentage of the automotive industry was 43 per cent last year.

As to products, the table and diagram on page 9 show to what extent, so to speak, the automotive industry is of chief importance in bars and sheets, the railroads to makers of rails and plates, and the oil and building industries to pipe makers and so on. Agriculture is shown to take one-quarter of the wire, buildings practically 60 per cent of the structural shapes and so on.

An unusually large amount of information has been received in respect to the production and distribution of alloy steel, but a special study of these data will be left for a later issue of THE IRON AGE.



How the Different Forms of Steel Were Distributed in 1926. Of bars, 30 per cent went to automobile makers, 17 to buildings, etc.

Lessened Activity in 1927 Is Dr. Haney's Forecast

Gradual Downward Readjustment Expected, Without Any Danger of a Crisis—Pig Iron Curtailment Foreshadowed—Much Progress in 1926

BY DR. LEWIS H. HANEY
DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

Summary

1. *The year* 1926 *was one of high volume of business, irregularly sustained at a level averaging nearly* 5 *per cent over the* 1925 *volume.*

2. *The failure of industry to show the usual autumnal upturn indicates a declining trend at the year end, and several maladjustments require correction. On the whole, the outlook for* 1927 *is not so good as it was for* 1926.

3. *The usual indications of a business crisis, however, have not yet appeared—any downward readjustment will probably be gradual and orderly.*

4. *Curtailment of pig iron output is forecast.*

ACCORDING to most ways of figuring its industrial character, the year 1926 was slightly better than I had anticipated. It is about as accurate as can be to say that, measured in physical volume, the total business of the year was about 5 per cent larger than the total for 1925.

The fact remains, however, that the year just closed has been characterized by much irregularity as between different sections of the country, different industries, and different companies within the same industry. And I think that the most notable fact has been the prosperity of the "leading companies," while other companies have fallen further behind. Moreover, the total for the year does not tell the entire story and, while the business trend was in general decidedly upward during 1925, the *trend* during 1926 was at most but an irregular sidewise one. Most basic manufacturing industries show a downward trend toward the end of the year, when a year ago they were on the upgrade.

Downward Trend as Year Ends

THIS situation is illustrated in the first chart, except that the abnormal coal production of October and November makes the business cycle curve seem to rise near the end. Pig iron output, too, was overexpanded in the same months.

Production in basic industries (Fig. 2) shows a double top, reaching similar levels in the spring and in the fall, with a considerable period of recession in between. The second peak is due largely to the excessive production of bituminous coal and petroleum. Even so, it will be noted that the curve does not rise so high as at the peak of 1923.

Agriculture has shown an irregular and not very satisfactory condition. Winter wheat sections have done well and the dairy industry has helped farmers quite generally. But spring wheat, corn and cotton sections developed an unsatisfactory condition as the year progressed, and on the whole live stock sections have not done very well. In a good many sections the process of liquidating inflated land values has been continued throughout the year. This reflects the reduction in the price of basic agricultural products, which has steadily carried the purchasing power of the farm dollar to lower levels (see Fig. 5).

Recovery During Summer Months

MANUFACTURING industry has been very irregular, on the average declining until June, recovering until October, and then receding during the remainder of the year. Our imports rather faithfully reflect the activity of manufacturing industry, being largely of materials, and the foregoing generalization is illustrated in Fig. 6.

Mining, including petroleum production, has been active throughout the year, with a general upward

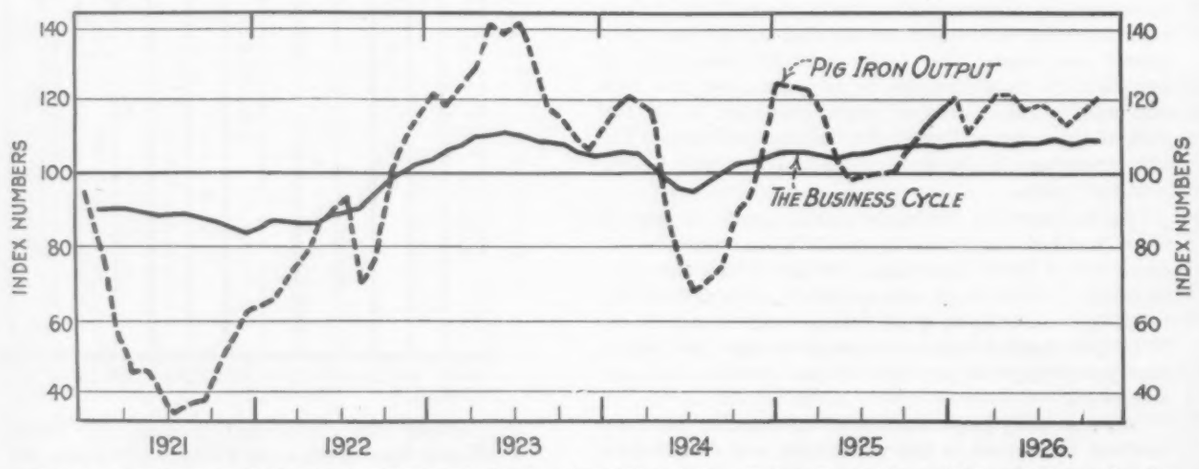


Fig. 1—*Business in* 1926 *Was Well Sustained at a Level Less Than* 5 *Per Cent Above* 1925, *as Shown by the Cycle Curve. Meanwhile, pig iron production fluctuated at a level about* 8½ *per cent higher*

trend. A high level of production existed at the close of the year, notably in bituminous coal, copper and oil, which commodities weakened in price.

The freight traffic of the railroads shows an irregular and slightly upward trend through November, chiefly on account of the heavy volume of coal toward the end of the year. On the whole it has been a good year for carriers but, with the decline in coal traffic, which has already begun, and with the backward conditions in the South and certain Western sections, the upward trend has already been checked. The favorable showing as to railroad earnings has been due partly to economy of operation and to the good supply and condition of equipment, the last factor explaining in part the small volume of steel taken by the carriers during the year. On the whole it seems that the railroads have about reached the limit of earnings for the present and a somewhat less favorable showing is probable in the first half of 1927.

Retail Trade More Active Than Wholesale

RETAIL trade has been in extraordinarily large volume throughout the year, as appears in Fig. 2. It has not, however, shown the upward trend that existed in 1925 and in the fall months has given indications of tapering off, the year ending with sales at about the same level as at the end of 1925. Some recent reduction in factory payrolls and a steady decline of farm purchasing power make it probable that the peak of retail trade has been reached.

Wholesale trade (Fig. 2) has been irregular and has made no gain through the year. Sales of finished steel expanded until October, when the volume fell off sharply and a further decline was recorded in November, the losses being most notable in the case of sheets. As a result, the total fell behind the 1925 record.

The whole business situation is well illustrated by the volume of bank debits, which reached a peak in March and, after a severe setback, developed a secondary peak in the fall, only to decline sharply through November and then recover part of the loss in December. To some extent the lower levels toward the end of the year were due to the steady decline in commodity prices, which went on almost without interruption, except that an abnormal run-up in coal prices affected the October and November indexes. Dec. 1 prices averaged about 11.3 per cent lower than in 1925.

Money rates gradually worked higher until near the end of the year, when there was a little easier trend. At the end, commercial paper was about the same as a year ago.

Business in 1926 Was Large, Though Irregular

I CONCLUDE that 1926 was a year of large but irregularly sustained volume of business. On the whole, industry and business were above normal. There was over-production in many lines at the beginning of the year, which was temporarily corrected in the summer, only to be renewed under the stimulus of the autumn season. Even so, the autumn business failed to come up to the spring peak in many lines, making due allowance for seasonal conditions. In fact, one of the most significant points for the business forecaster is the failure of the more significant indexes to show the usual seasonal expansion in the critical fall months. It may be said that, in general, 1926 differed from the immediately preceding years in its failure to show the pronounced upward trend at the end which they had manifested.

Situation Not So Auspicious Now

NEVERTHELESS, conditions at the beginning of 1927 do not in all cases compare favorably with those that existed at the beginning of 1926. The general downtrend in the industrial output that is now in evidence may be mentioned first. Again, the lower level of commodity prices (see Fig. 4) tends to make profit margins narrower. Competition is even keener than a year ago, and the whole situation finds expression in the larger number of business failures. The outstanding unfavorable point is the relatively low level which now prevails in farm purchasing power.

Real Gains During Last Year

MUCH real progress was made during 1926. *Among the more significant points I would mention the following:*

(1) *The building shortage was entirely filled and rentals were materially reduced, on the average.*

(2) *Textile raw material prices, which have been abnormally high for several years, were materially reduced, thus preparing the way for greater prosperity in that basic industry and for lower costs of living.*

(3) *There was gradual improvement in several backward industries, such as sugar, leather, and cotton and wool textiles.*

(4) *Progress was made toward farm liquidation and toward a readjustment of American farming to post-war conditions, though this is still incomplete.*

(5) *European industrial recovery made considerable strides, notably in Germany and Italy.*

(6) *Great progress was made toward a general return to a gold basis and toward a stabilization of currencies in the leading nations. (The foregoing improvements have been and will be attended by disturbed conditions, both in the countries directly affected and in the United States as a competitor, but ultimately will benefit all.)*

(7) *Commodity price levels in this country have been readjusted downward without any crisis. As currencies are put on a gold basis and the volume of trade expands (while gold production is limited) the broad trend of commodity prices should be downward during the next decade. A considerable element of inflation still exists. That price levels could be readjusted so materially without causing a serious business setback is a notable achievement.*

(8) *Efficiency in production, including transportation, has been greatly increased, which has enabled efficient concerns to show profits even at materially lower prices for their products.*

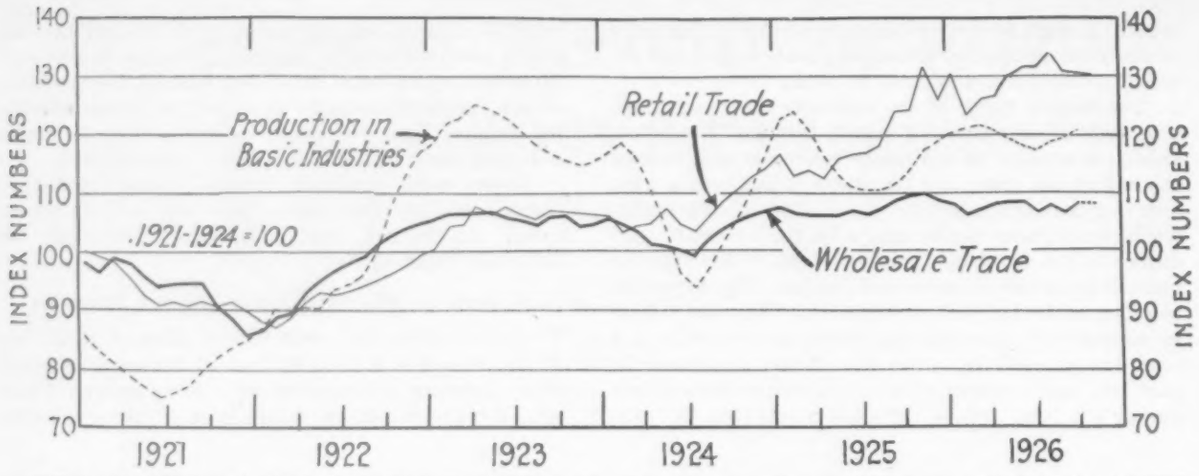


Fig. 2—Retail Trade, While at a High Level, Showed a Tendency to Taper Off Toward the End of 1926. Wholesale trade was very irregular, with a slightly declining trend; production in basic industries made little if any net gain, but was in good adjustment with trade

In spite of large crops, the prices received by the farmer have fallen so sharply that the total value of the chief crops is much less than last year. Not only this, but agricultural products have declined much more in price than have non-agricultural products (see Fig. 5), with the result that the farmer's dollar will not go so far as it did a year ago. This is notably true of cotton.

Another notable difference lies in the fact that two of the chief props of the prosperity of recent years have shown signs of weakening. I refer to building activity and the automobile industry (see Fig. 3). Toward the end of the year there was some little recovery in building contracts, but contemplated construction and building permits continued to decline, making due allowance for the merely seasonal changes, and were at least 11 per cent under the level of a year ago.

Automobile production fell off with extraordinary sharpness in October and November and present indications are that the December volume will fall to the lowest level, considering the season, that has been reached since June, 1924. These conditions have been clearly reflected in the steel industry through declining sales of sheets and structural steel.

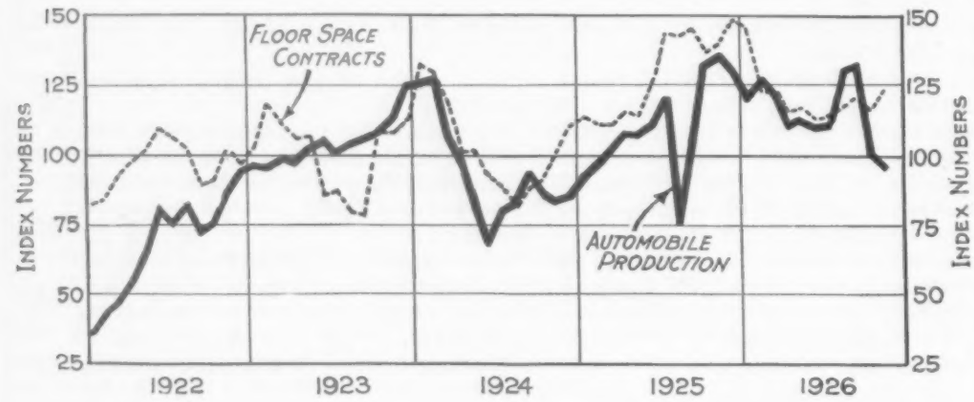


Fig. 3—Automobile Production, Aside from a Spurt in August and September, Lost All That It Had Gained in 1925. Building contracts (floor space), after a sharp setback in the first half, recovered a little, but were considerably lower than a year ago

Too Much Pig Iron Made

ANOTHER unfavorable condition at the end of 1926 is what seems to be fairly called an excessive production of pig iron. As shown in the first chart, the

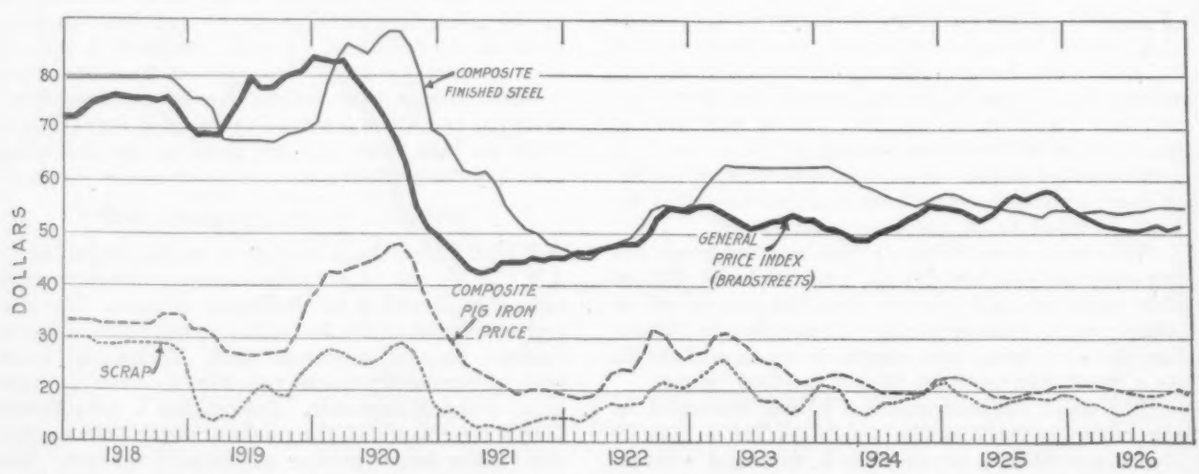


Fig. 4—Commodity Prices Sagged All Year, Though Some Stability Was Shown in the Autumn. Iron and steel prices were more stable, declining less than the average

pig iron output, adjusted to eliminate merely seasonal conditions, increased in October and November and my studies show that it is abnormally large in comparison with the steel ingot output. This condition usually means that a readjustment will be required. It did not exist a year ago. At the same time, unfilled orders for steel are lower than last year and have failed to show as much gain at the year-end as is usual.

One of the most significant recent developments has been the downward trend in the employment and earnings of factory labor. The total payrolls of the manufacturers reporting to the Federal Government were about 3 per cent smaller in November than in October.

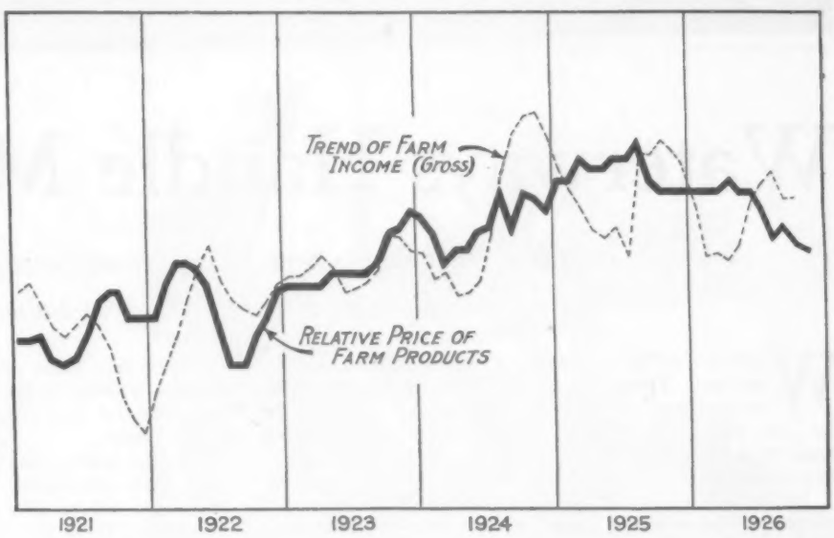


Fig. 5—The Purchasing Power of the Farm Dollar Fell During 1926. Agricultural products in November were relatively at only 80 per cent of non-agricultural prices (on a pre-war basis), against 87 per cent a year ago. In spite of large crops, the farmers' gross income was not so large as last year

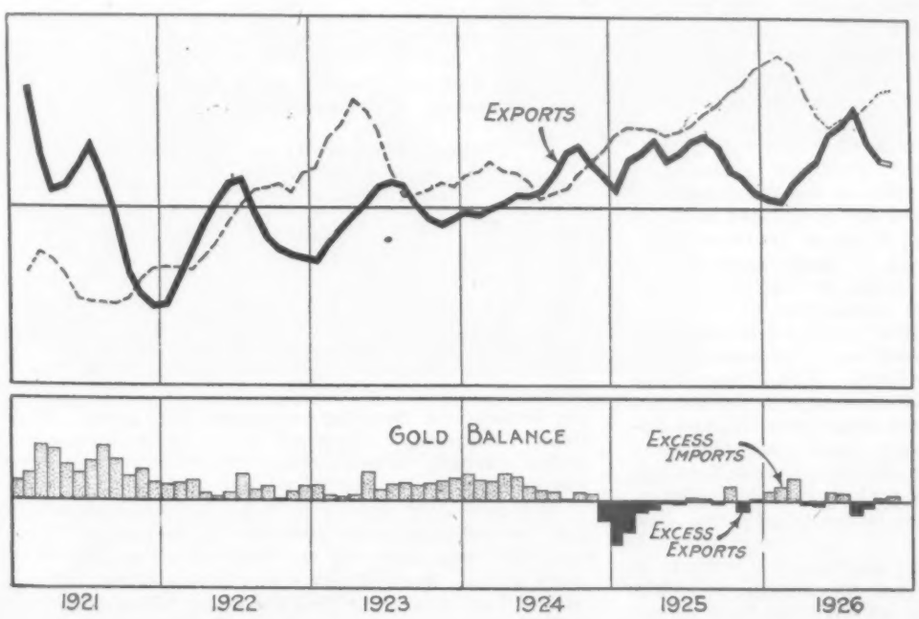


Fig. 6 — During the Last Two Years, Exports Have Been Relatively Low Compared With Imports. Gold exports have at least equaled gold imports

This trend cannot go far without curtailing the purchasing power of labor, upon which the large volume of retail trade during the year has rested. Students of industrial trends will watch the December and January returns with extraordinary interest and further declines, if they occur, will be conclusive evidence of a considerable recession.

The usual indications of a major business crisis, however, have not appeared, or at least only partially and in a mild form. Money rates have been fairly easy, with none of the stringency that attends the development of a condition in which general forced liquidation is required. A spirit of caution has generally prevailed and, whatever the reason, hand-to-mouth buying has continued in evidence. Mercantile inventories have on the whole been very light. There has been little complaint of the inefficiency of labor and the output per employee has been large and fairly steady. General over-production cannot be demonstrated to exist and I estimate that the total value of the commodities produced from month to month has recently not been much out of line with the purchasing power of consumers.

Some Unfavorable Symptoms Present

NEVERTHELESS, the careful student of the situation will find several maladjustments and some of the unfavorable symptoms which often arise prior to business recessions. As already noted, the prices of farm products are rather seriously out of line with prices of manufactured products. Building materials and clothing are still abnormally high and this tends to prevent a normal alinement of the nation's industries. Again the total inventories of manufactured goods in first hands are abnormally large. To some extent this is doubtless due to the practice of hand-to-mouth buying and is offset by the small mercantile inventories, but to some extent it represents over-production in certain basic industries, among which may be mentioned copper, cotton, petroleum, silk, lard, automobiles, building, corn and pig iron.

(*Concluded on page* 78)

Waterways Handle More Steel

Iron and Steel Plants Seek Escape from Localization by Shipping on Rivers and Great Lakes

WATERWAYS—a means of escape from localization! This conception of the possibilities in water transportation is coming to the fore in the iron and steel industry at a time when the economical distribution of its products is its most baffling problem.

In the face of steady gains in operating efficiency in recent years, producers have been burdened with heavy handicaps in marketing their products. In contrast with conditions before the war, rail distances, in terms of freight rates, have been greatly lengthened. For the steel mills, disadvantages in freight rates were transformed into formidable trade barriers when, with the abandonment of Pittsburgh Plus, basing points sprung up in producing centers outside of Pittsburgh, notably at Chicago and Birmingham. With this revolutionary change in selling practice, mills in the Pittsburgh and contiguous districts that had an established trade in the Middle West, Northwest, South or Southwest were confronted with the prospect of losing most of that business. Chicago district mills, on the other hand, although largely freed from competition in their natural market, suffered because of another post-war shift of trade currents, i. e., the diversion of transcontinental traffic through the Panama Canal. This change made the Pacific Coast an economic appendage of the Eastern seaboard and Europe and took away from Chicago district producers the flourishing Coast trade that they formerly enjoyed. Even the rapidly growing Birmingham district has been beset with new trade obstacles, the most notable of which has been foreign competition in Texas, one of the largest of its adjacent markets. The vessel rate on steel from Antwerp or Liverpool to Galveston is only about $3 per ton, which, with duty added, is lower than railroad freight rates from American mills.

Revival of Water Shipments Began in 1921

All of these factors are circumscribing influences, but American business, so long accustomed to rapid growth, is impatient of economic restraints and has sought a way out.

The revival of water shipments of steel came in the fall of 1921, when the Jones & Laughlin Steel Corporation inaugurated regular river shipments of its products. This was virtually coincident with the establishment of Chicago base prices on plates, shapes and bars. River shipments from Pittsburgh have increased steadily since that time, and more recently there has been a notable growth of water shipments from the Birmingham district and an expansion of steel traffic on the Great Lakes.

Water movements of pig iron, scrap and cast iron pipe have also been on the increase. On the Eastern seaboard, where foreign competition in pig iron has been keen, there has been a growing use of waterways by domestic blast furnaces. Cast iron pipe makers, under the same competitive compulsion, are turning to the water not only for the delivery of their product to Eastern, Gulf and Pacific coast points, but for the inbound shipment of raw materials.

Progress Made in Water Transportation

For many years the iron and steel industry has seen the economy of the water shipment of ore on the Great Lakes. With the benefit of that experience it has faced the necessity of developing water transportation of steel with confidence and intelligence. On the Ohio River, mills have made heavy investments in tow boats, barges and fully equipped docks. On the Great Lakes, boats with self-loading equipment have been put into service. At the same time private enterprise, the Government and municipalities have responded to the growing demand for carrying equipment and docks. The Inland Waterways Corporation, a Government-controlled company, is successfully operating a barge service on the Warrior and Mississippi rivers.

The revival of interest in water transportation has given a new impetus to waterway improvements. The complete canalization of the Ohio River is only two years away. Work is under way on the Great Lakes-to-Gulf link, which will give Chicago a 9-ft. channel to the Mississippi River, and the deepening of the Missouri River between St. Louis and Kansas City is making steady progress.

Total shipments of steel, pig iron and scrap on the Great Lakes in 1926 are estimated at between 400,000 and 450,000 tons. In the Pittsburgh district shipments of steel on the Ohio River for the first 11 months of 1926 totaled 295,316 net tons, according to estimates by United States Engineer's office at Pittsburgh. These figures only include movements as far as Lock No. 11, located at Wellsburg, W. Va., just below Steubenville, Ohio, and north of Wheeling, W. Va. Shipments from lower river points such as Wheeling, Parkersburg, W. Va., and Marietta, Ohio, are not covered in the estimates, which are made by the lock-keepers under the jurisdiction of the Pittsburgh office. Destinations are not asked as the boats pass through the locks, and

The Illustration at the Top of the Page Shows a Tow of 8500 Tons of Miscellaneous Steel Products Passing Through a Lock at Louisville. The barge in the left foreground shows the method of covering a cargo to protect it from moisture. Shipments of tin plate and wire are handled in this manner.

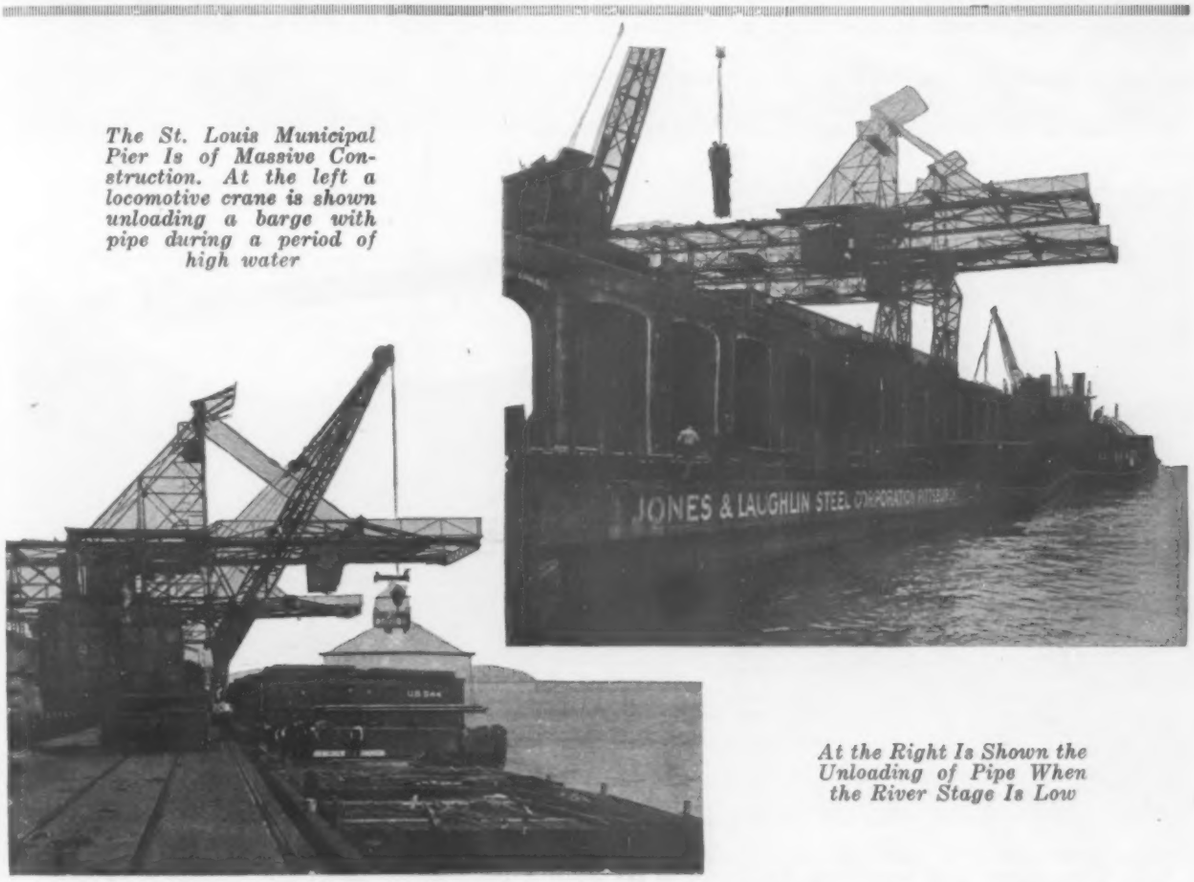
consequently there is no way of telling how much of the Ohio River freight from Pittsburgh goes to Mississippi River points. Once a year shippers are asked to give actual figures of shipments made during a 12-month period.

On the Mississippi River division of the Inland Waterways Corporation, shipments of iron and steel in the first nine months of 1926 totaled 57,952 tons, as against 64,329 tons for all of last year. On the Warrior River division, shipments up to Sept. 30, 1926, aggregated 65,784 tons, compared with 76,562 tons for the entire year 1925.

What Pittsburgh District Plants Have Done

Use of the inland waterways by Pittsburgh district steel companies for the movement of their products to Charleston, W. Va., through an affiliated company, the W. C. Kelly Barge Line, brought its steel from Pittsburgh to its plant via the Ohio and Kanawha rivers and had plans for the building of an assembling and shipping dock at Glassport, Pa., on the Monongahela River, as well as for a considerable enlargement of its river fleet. The company, however, last year turned over its towboat and six barges to the Mississippi-Warrior Service (Inland Waterways Corporation), and has been depending on a privately operated barge line between Pittsburgh and Charleston, while its plans for greater use of the rivers are in abeyance. The Pittsburgh Steel Co. also uses the privately owned barge line, the Inland Waterways Co., with headquarters in Louisville, in making river shipments. The Carnegie Steel Co., the Jones & Laughlin Steel Corporation and

The St. Louis Municipal Pier Is of Massive Construction. At the left a locomotive crane is shown unloading a barge with pipe during a period of high water



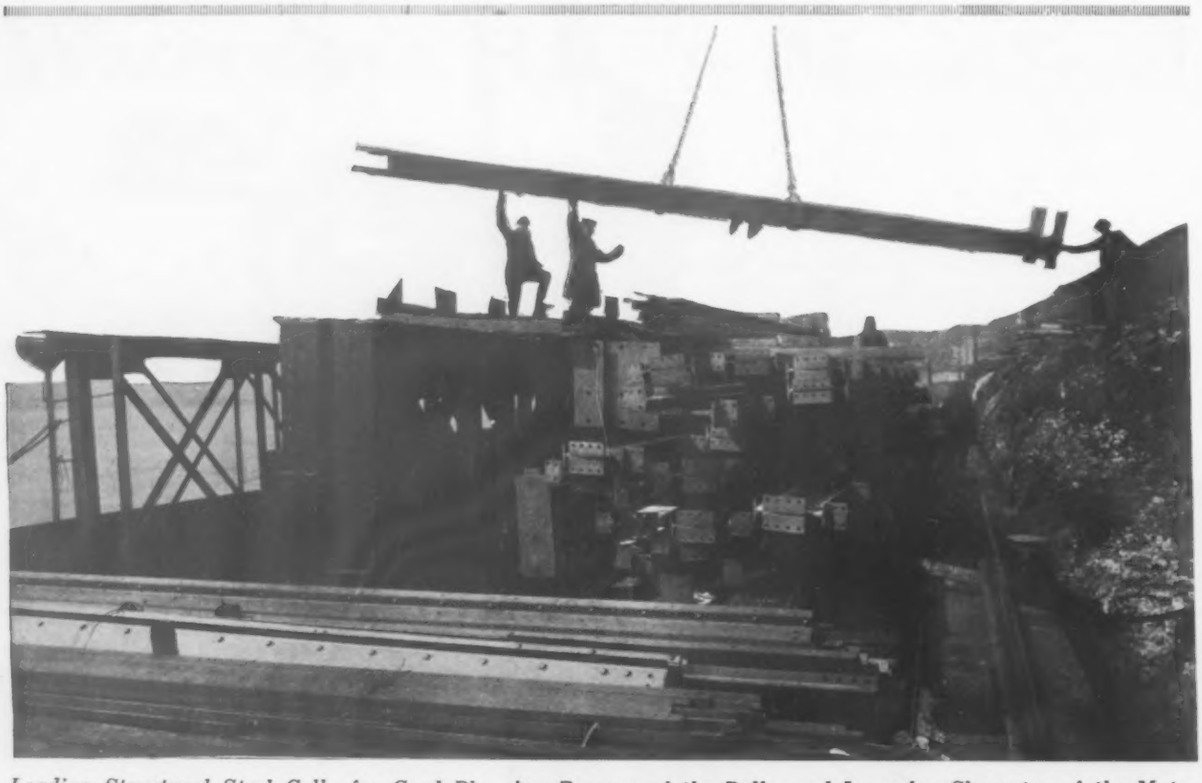
At the Right Is Shown the Unloading of Pipe When the River Stage Is Low

consuming districts is not exactly a new venture, since the American Steel & Wire Co., before its absorption by the Steel Corporation 26 years ago, used this means of getting a stock of nails, wire and fencing materials to its Memphis warehouse. But such shipments in those days were possible only during the periods of high river stages, and only during half of each year was the water deep enough to permit the passage of a barge drawing as much as 9 ft.

It remained for the Jones & Laughlin Steel Corporation to inaugurate regular river shipments of steel products in 1921. In the following year the Steel Corporation adopted the plan, consolidating the river activities of those of its subsidiaries that had maintained barges and towboats for the movement of coal and steel in and about the Pittsburgh district and placing them under the direction of the Carnegie Steel Co. It was not long afterward that the Pittsburgh Steel Co. saw the advantage of using the rivers, and the next company to join the movement was the Wheeling Steel Corporation. The Weirton Steel Co. recently completed a dock for handling river shipments of coal and before the end of this year will have completed an addition to it that will permit it to make shipments of steel by the river routes. For a time the Kelly Axe & Tool Co., the Wheeling Steel Corporation are the companies that maintain their own towboats and barges, but with the completion of the locks and dams in the lower Ohio River from Evansville, Ind., to Cairo, Ill., it is probable that other steel companies on or within easy access to the rivers will have their own river equipment.

River shipments were begun in an effort to break through a cordon of high railroad freight rates that made it difficult for Pittsburgh district and Valley steel manufacturers to reach the desirable markets of the South and Southwest in competition with mills more advantageously located. Actual experience in barging, however, caused producers to revise their ideas regarding the possibilities in water shipments. Except in the case of a few isolated customers willing to take large tonnages of material at one time, river shipments are primarily for stock. The general policy of buyers is to purchase in relatively small amounts for early delivery, and barge shipments are hardly fast enough to meet such demands. While the movement down-river from Pittsburgh to Memphis has been made as quickly as in nine days, that was during a period when the water was at flood stage and it was not necessary to go through the locks. The ordinary time is longer, and steel that is wanted by a specified time still goes

by rail. Pipe, wire products, standard sizes of bars and shapes, cold-finished steel bars, sheets and other products usually to be found in steel warehouses are moving by river to go into stock. Warehouses that formerly were used as transfer points for rail shipments to interior destinations now have the status of supply depots to serve the territories adjacent to them. The advantage of such centers of distribution becomes apparent when it is realized that pipe is the most important commodity from the standpoint of demand in the Southwest and when drilling or a pipe line is scheduled, the oil companies cannot wait. On the other hand, some barge shipments go directly to the consumer. One Pittsburgh company has sent tin plate down the river to a New Orleans can factory, but tin plate usually moves from the mills well in advance of its cutting and there is rarely a pressing time element in its delivery. Likewise cotton ties, being of standard design, can be made up and shipped well ahead of their use. A Pittsburgh maker of cotton ties, in fact, shipped all of its output by river in 1926.

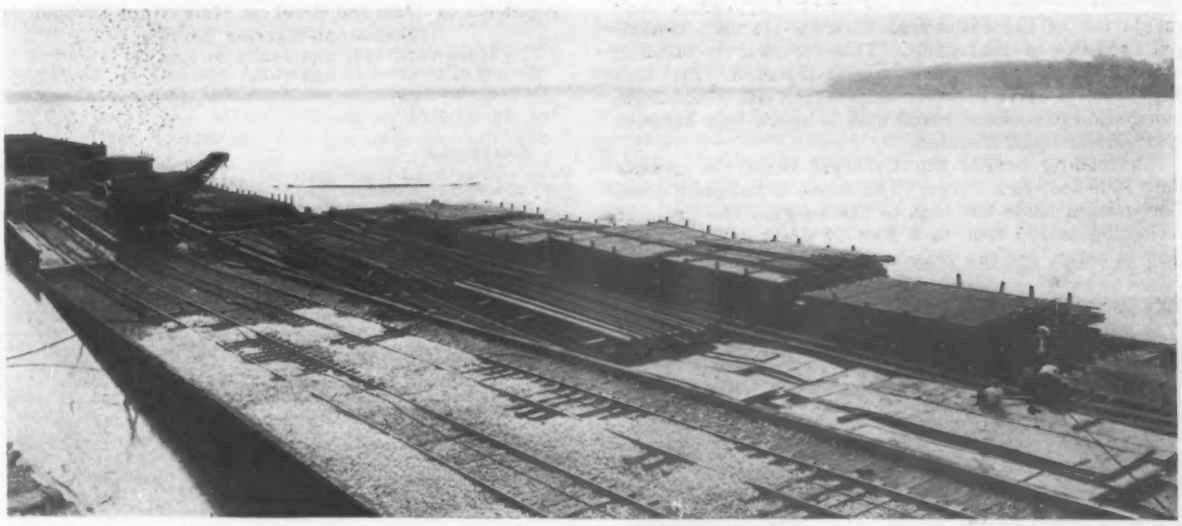


Loading Structural Steel Calls for Good Planning Because of the Bulky and Irregular Character of the Material. These barge loads went from Pittsburgh to the Jones & Laughlin warehouse and terminal at Memphis

Railroad congestion was another reason for the development of river transportation by Pittsburgh district mills. When they found in river barges a remedy for congestions of coal shipments on the railroads, it was natural that they should turn to the rivers not only to get their steel to distant points cheaply, but to escape delays incident to car-choked railroad lines, which occasioned so many complaints on the part of consumers five or six years ago. By taking some of the load off the railroads the mills enabled the latter to function more easily. By placing a stock at some convenient distributing point they gave the railroads a haul from river terminals to inland destinations and at the same time insured prompter delivery to consumers. The river service has never been urged as a competitor of the railroads, but rather as a necessary supplement to rail facilities. It has helped the railroads in two ways: It lightened their loads when they were trying to develop efficiency, and it stimulated the railroad managements to greater effort, because, if river service became too extensive, it could not fail to affect railroad revenues.

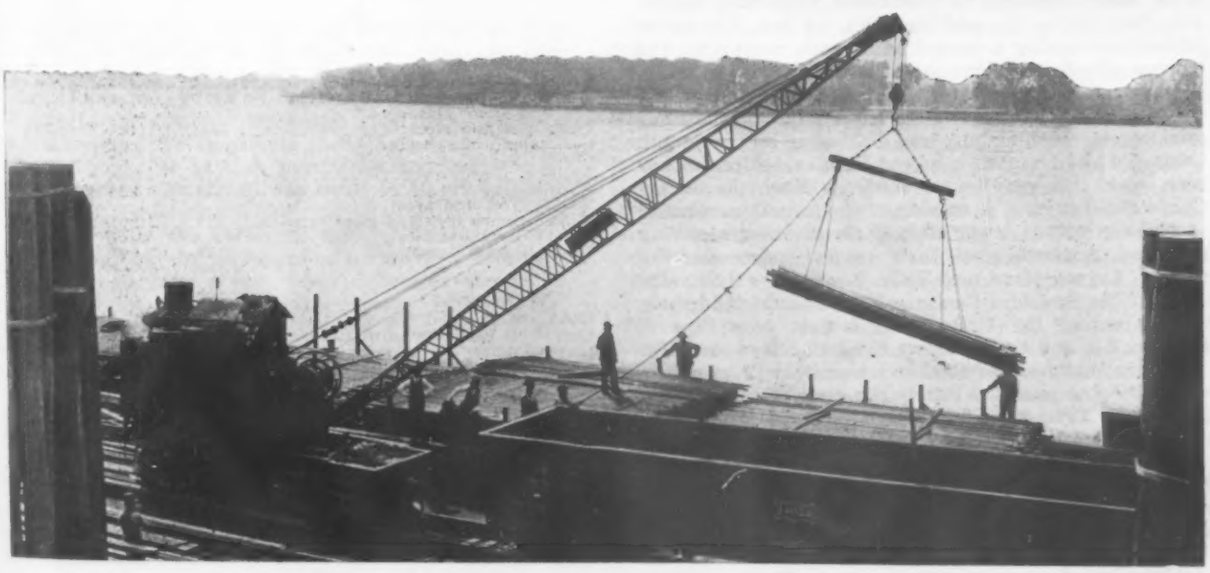
In the Pittsburgh harbor there are now 85 towboats and 2000 barges for the carrying of coal, steel, sand and other bulk freight. The experiences of the past five years in river shipments have charted the course of the Pittsburgh district steel companies. They know what river shipments cost and whether there is a real saving over all-rail shipments. Shipping by river has not all been at a saving, because, in spite of shipments as long as 30 years ago, the efforts since 1921 have been of a pioneering character and pioneers usually pay the bills for those who benefit from their initiative. It costs money to maintain crews at a down-river point when the river depth is not sufficient for the boats to be floated back to the home base, to say nothing of the overhead of the barges rendered idle by insufficient river stages. It costs money when a tow of barges has grounded in shallow water and has to be hauled off. These are some of the pioneering experiences of those companies which have made shipments beyond the zones of the locks and dams into waters that are navigable only in flood stages. They also endured the lack of dock facilities at many points where shipments might be landed much more conveniently to ultimate destination than where the unloading had to be made. But their efforts have not been in vain, as municipalities along the rivers have seen the benefits and docks have been and are being built. Moreover, in two years there will be a constant stage of water in the Ohio River from Pittsburgh to its junction with the Mississippi.

The Jones & Laughlin Steel Corporation maintains a terminal and warehouse at Memphis and a warehouse in Cincinnati. The Wheeling Steel Corporation has a warehouse at Memphis. Others delivering steel at that port use the municipal terminal and warehouse. The Pittsburgh Steel Co. maintains a warehouse at St Louis; others going there use the public facilities. Memphis is as far as Jones & Laughlin Steel Corporation goes regularly with barge shipments, usually turning its loaded barges over to the Mississippi-Warrior Service at that point for deliveries at lower Mississippi River destinations. This company has made shipments direct to St. Louis, but found that too much time was lost in making the turn on the Mississippi; consequently, it is now turning its barges for St. Louis over to the



THE floating type of dock has the advantage of keeping barges and railroad cars on the same plane regardless of the stage of the river. At the right is depicted such a dock at the St. Louis terminal. It consists of a series of concrete barges that rise and fall with the water level so that a transfer platform attached to the barges is always at the same level with respect to the floors of railroad cars spotted on the barge tracks and the decks of freight barges moored alongside. In the foreground is a river-going barge equipped to handle package freight. In the background two locomotive cranes mounted on a concrete barge are transferring freight too heavy to be trucked.

At the top of the page is shown a floating type of dock located at Memphis where the difference between high and low water is as much as 48 ft. The photograph at the bottom of the page shows a locomotive crane at the Memphis dock transferring steel from barge to railroad car.



Mississippi-Warrior Service at Cairo, Ill. New Orleans has been the destination of all Steel Corporation shipments out of the Pittsburgh district. It uses municipal facilities at that point. This company is building a large terminal and warehouse at Houston, Tex. This it expects to serve by river shipments from Pittsburgh, using the intracoastal canal that is under way between New Orleans and Houston.

In loading barges the Carnegie Steel Co. usually puts 1000 tons in a barge. The Jones & Laughlin Steel Corporation loads 800 tons to the barge. The basis of reckoning is 100 tons to a foot of draft. The lighter load is safer, for the reason that there are frequently

Interior of a Barge Loaded With Steel Pipe. Small sizes are placed at the bottom, large sizes in the middle and small sizes on top. This is a space-saving method, since fewer pieces would fit in if large-diameter pipe were placed at the bottom

stretches of river where there is not sufficient stage for a boat drawing more than 8 or 9 ft.

Developments on the Lower Ohio

The use of the Ohio River by iron and steel companies is not confined to producers in the Pittsburgh district. An Ironton, Ohio, manufacturer of nails and wire has its own towboat and 10 barges, each with a capacity of 750 tons. Shipments of nails and wire are being made regularly to Cincinnati, Louisville, Evansville, Ind., Cairo, Ill., and Memphis. In fact, Cincinnati jobbers are taking a bargeload of nails monthly. The Ironton plant's excellent facilities for delivering material by water have won for it a very large share of the wire and nail business at Ohio River points. The same producer is shipping pig iron by barge to Cincinnati, Louisville and Evansville, and at least one shipment has been made this year as far south as Nashville on the Cumberland River. A number of the largest consumers of pig iron on the lower Ohio River are now receiving a liberal percentage of their total requirements by water. Among them may be mentioned the Louisville plant of the Standard Sanitary Mfg. Co., the Addyston, Ohio, plant of the United States Cast Iron Pipe & Foundry Co. and the Andrews Steel Co., Newport, Ky.

Water shipments of steel to lower Ohio River points are also being made by Pittsburgh district mills. Two jobbers at Evansville, Ind., have received large shipments of finished material by barge from a leading Pittsburgh district producer at various times during the past year. The Jones & Laughlin Steel Corporation recently acquired a warehouse at Cincinnati, which doubtless will be served by barge shipments.

The increased use of the river has stimulated the construction of adequate terminals. At Cincinnati, the

Shipments of Iron and Steel on Mississippi Division of Mississippi-Warrior Service

Years 1924, 1925 and Jan. 1 to Sept. 30, 1926

(In Tons)

	1924	1925	First Nine Months, 1926
Southbound			
Rails and railroad track material	1,959	1,288	526
Bar, sheet and structural steel	18,704	26,304	19,474
Tin and terne plate	1,259	1,965	1,564
Pipe, iron and steel	4,496	11,048	12,927
Car axles and wheels	1,449	759	....
Chain	403	606	....
Nails	1,073	1,600	....
Wire	1,570	2,619	....
Tanks, iron and steel	651	57	....
Miscellaneous iron and steel articles	9,525	16,574	22,393
	41,089	62,820	56,884
Northbound			
Rails and railroad track material	930	....	....
Bar, sheet and structural steel	706	939	416
Tin and terne plate	....	....	....
Pipe, iron and steel	6	25	....
Car axles and wheels	....	....	....
Chain	29	....	....
Nails	....	21	....
Wire	289	117	....
Tanks, iron and steel	....	....	....
Miscellaneous iron and steel articles	51	407	652
	2,011	1,509	1,068

Note: Chain, nails, wire, etc., have been classified under "Miscellaneous Iron and Steel Articles" in year 1926.

Cincinnati River-Rail Terminal Co. has recently completed a dock with modern material-handling equipment. This company's rates are as follows:

In Group 1, including all structural material exceeding 38 ft. in length, the charge for transferring from barge to railroad car is $1 per ton. In case the material is less than 38 ft. in length, the charge is reduced to 65c. per ton.

Group 2 embraces nails, bolts and nuts in kegs, wire in rolls or spools, and tin plate in boxes. For this material the transfer charge is 85c. per ton. If the material is packed so that it can be handled in lifts of a number of small units at one time, the charge is 65c. per ton.

Pig iron, or any other material handled by magnets, is transferred at a cost of 35c. per ton.

The rates were based on similar charges at Louisville and Evansville and the actual operating cost as computed by the company. The present charges, however, are considered temporary, and it is the hope of the company that they can be reduced somewhat later.

Water Shipments in the St. Louis District

Barge shipments of steel to St. Louis, like those to other river points that have been mentioned, are largely for replenishing warehouse stocks. A large Pittsburgh steel company that has a warehouse at St. Louis has shipped wire products by barge and rail as often as

Shipments of Iron and Steel on Warrior Division of Mississippi-Warrior Service

Years 1924, 1925 and Jan. 1 to Sept. 30, 1926

(In Tons)

	1924	1925	First Nine Months, 1926
Southbound			
Rails and railroad track material	38,464	50,458	37,044
Bar, sheet and structural steel	9,857	10,457	11,902
Tin and terne plate	....	....	....
Pipe, iron and steel	....	47	1,778
Car axles and wheels	....	38	....
Chain	....	....	....
Nails	516	3,053	....
Wire	139	829	....
Tanks, iron and steel	....	....	....
Miscellaneous iron and steel articles	119	1,167	3,475
Billets, iron and steel	....	....	....
Iron, pig and bloom	784	5,524	672
	49,879	71,573	54,871
Northbound			
Rails and railroad track material	9	155	....
Bar, sheet and structural steel	709	1,223	744
Tin and terne plate	....	....	....
Pipe, iron and steel	377	427	63
Car axles and wheels	....	....	....
Chain	....	....	....
Nails	....	....	....
Wire	....	....	....
Tanks, iron and steel	....	....	....
Miscellaneous iron and steel articles	190	1,009	432
Billets, iron and steel	....	2,175	4,049
Iron, pig and bloom	....	....	5,625
	1,285	4,989	10,913

Note: Chain, nails, wire, etc., have been classified under "Miscellaneous Iron and Steel Articles" in year 1926.

once a month, although recently the shipments have been somewhat irregular. Formerly the all-water route was used from Pittsburgh to St. Louis, but it was found more satisfactory to ship by barge to Louisville and by rail from there to St. Louis. Each shipment consists of about 500 tons. The all-rail rate from Pittsburgh to St. Louis is 43c. per 100 lb., and the river-and-rail rate via Louisville is 35c., so that the saving is 8c. per 100 lb. The unimproved section of the Ohio River between Evansville and Cairo is an obstacle to regular all-water shipments to Mississippi River points. Combination river-and-rail rates, therefore, are being employed to a considerable extent. To Memphis the river-and-rail rate via Louisville is 40.7c. per 100 lb., as against an all-rail charge from Pittsburgh of 56c.

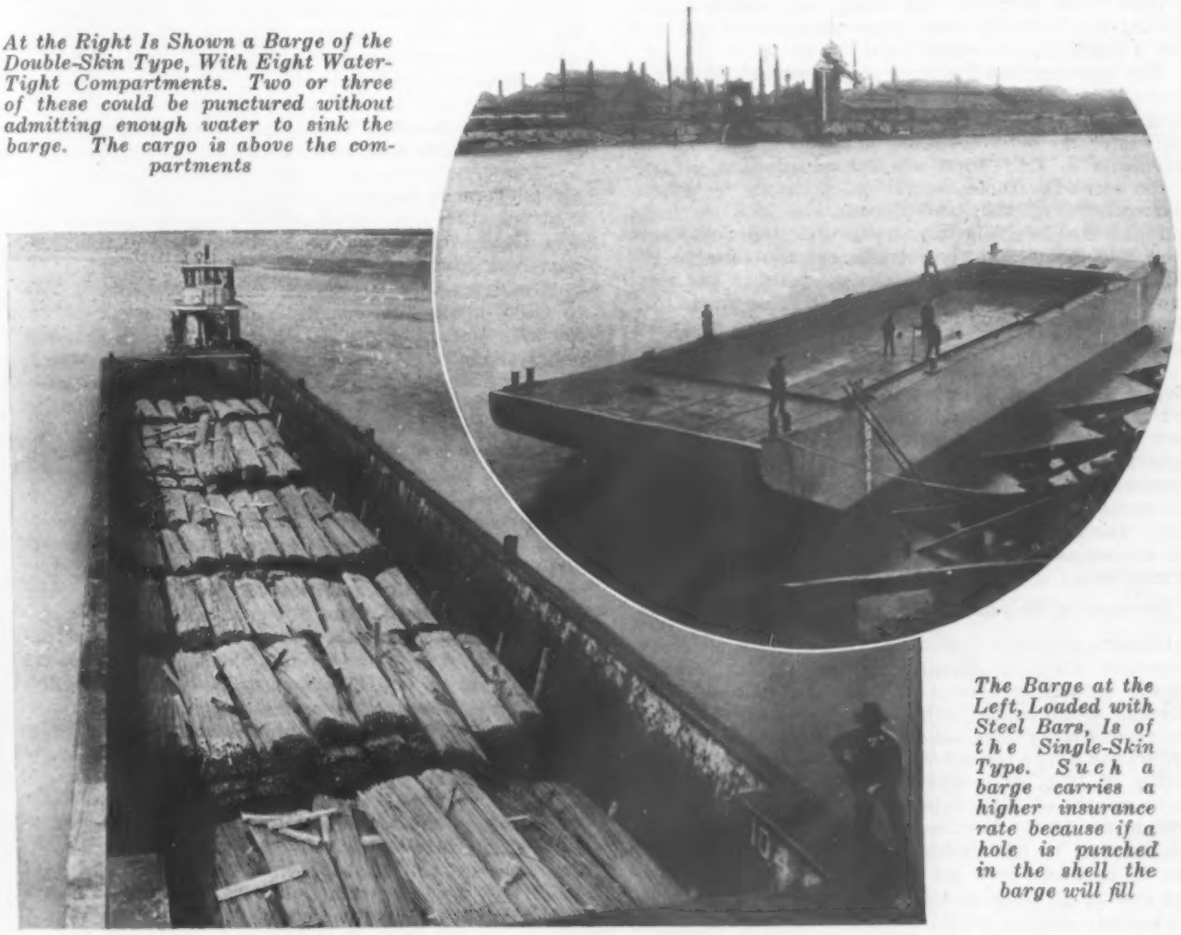
Another important Pittsburgh steel company utilizes the rivers for shipments to St. Louis, although it has no warehouse at that point. Its last barge shipment of pipe to St. Louis was made in March and was consigned to a leading jobber.

Occasionally the ability to ship by water operates to the advantage of producers in permitting shipments from more distant points when deliveries cannot be made conveniently from nearby plants. In February, 1925, a St. Louis consumer received a water shipment of 850 tons of bar-size tees from Pittsburgh. The material was carried the entire distance by river, being unloaded at the St. Louis municipal docks. The tees were in 250-lb. bundles and had been rebundled in 10,000-lb. major lifts. The order for the steel had been placed with a Chicago mill on the basis of the Chicago base price plus the railroad freight rate to St. Louis.

Foreign shipments of steel to St. Louis via the Mississippi River have been almost negligible, although not entirely lacking. A St. Louis manufacturer of building specialties this year bought 400 tons of 1 x 1 x ⅛-in. mild steel tees for shipment from Antwerp, Belgium. The first lot of 125 tons left Antwerp on Aug. 13, landed in New Orleans on Oct. 5 and arrived in St. Louis Nov. 5. A second shipment, which also moved entirely by water, arrived about three weeks later, and a third shipment of about 100 tons is now on the way. The latter will probably be loaded on cars at Cairo, Ill., for shipment by rail to St. Louis, since navigation north of Cairo is closed on account of ice floes. The buyer reports that the steel that arrived was in poor condition, being badly bent and twisted. Another shipment of 100 tons of Belgian structural steel moved from New Orleans to St. Louis by water and thence by rail to Red Oak, Iowa.

A canvass of fabricators in St. Louis indicates that no barge shipments of plain material have been received for some time. A leading fabricator has not received any steel by barge since 1922, when a saving of $2 a ton was made on a shipment of 2000 tons. Since that time no concessions have been offered on water shipments, and as no saving could be made from delivered prices quoted by Chicago mills, there has been no object in buying barge steel. Moreover, river deliveries are slower than railroad deliveries, a large order must be placed to obtain a barge shipment, and a large tonnage arriving at one time involves difficulties in handling, storing and financing. Fabricators occasionally use barges for shipments of steel work to Memphis and New Orleans. This is done only when there is plenty of time for the steel to reach destination.

St. Louis district producers of iron and steel have lately commenced to take interest in water transportation. The recent expansion in the pig iron capacity of one company led it to experiment with water shipments in an effort to find a broader market for its product. Last summer barges of pig iron were shipped from St. Louis to Newport, Ky., Addyston, Ohio, and other points. The barges had come to St. Louis loaded



At the Right Is Shown a Barge of the Double-Skin Type, With Eight Water-Tight Compartments. Two or three of these could be punctured without admitting enough water to sink the barge. The cargo is above the compartments

The Barge at the Left, Loaded with Steel Bars, Is of the Single-Skin Type. Such a barge carries a higher insurance rate because if a hole is punched in the shell the barge will fill

with West Virginia coal, and the pig iron was shipped to give them a return haul up the Ohio River. While docks at East St. Louis are equipped to handle pig iron and coal, some of the Ohio River destinations were lacking in adequate unloading facilities. Since that time considerable progress has been made in equipping docks at Ohio River points, and the prospects for similar back hauls in coal barges have improved. In the past water shipments of coal from the upper Ohio Valley to St. Louis have been hampered by a lack of carrying equipment, but it is understood that a number of important West Virginia coal companies will have their own barges by next summer. A fact that cannot be overlooked in connection with shipments from St. Louis to Ohio River points is that sharp competition will be encountered from an Ohio River producer of pig iron with a much shorter water haul.

The opportunities for river shipments in other directions are limited. Deliveries to points south and north along the Mississippi River are so small that the railroads offer the most desirable means of transportation. Shipments to Gulf ports are out of question because of the more favorable freight rates on pig iron from Sparrows Point, Md., and Europe. A lack of docks equipped for handling pig iron, variations of water levels and insufficient river traffic are obstacles to the shipment of iron to upper Mississippi points. The total tonnage of all products moving north is so small that when pig iron is only a part of a cargo the shipment must wait for the accumulation of other freight.

For several years the St. Louis district has been receiving barge iron from an Alabama furnace located on the Tennessee River. Some of this is shipped all-river via the Tennessee, Ohio and Mississippi Rivers, while the remainder moves by river and rail, being transferred from barges to railroad cars at Metropolis, Ill. Some of these shipments go as far north as Chicago. The rail and river rate to Chicago is $4.18 per ton, as compared with an all-rail rate of $6.01 from Birmingham.

Increase in Rail-and-River Traffic from Chicago

Chicago, although it still lacks a navigable all-water connection with the Mississippi River, is shipping a steadily increasing volume of traffic for rail-and-river delivery. Southbound carload shipments of all products from Chicago via railroad and Inland Waterways Corporation barge totaled 7513 carloads for the first 11 months of 1926, as compared with 5940 carloads for the 12 months of 1925, 4616 carloads for 1924 and 3179 carloads for 1923. For the month of November, 1926, when a total of 618 carloads moved south from Chicago, 54 carloads, or 9 per cent, were for export shipment and 22 carloads, or 3½ per cent, were for delivery at American coastal points.

Shipments of steel by rail and river from Chicago are still comparatively small, although they are increasing. During the first 11 months of 1926 two Chicago producers of heavier finished steel products shipped 392 carloads by rail and river as against 303 carloads shipped in the 12 months of 1925 and 337 carloads shipped in 1924. The shipments of one of these companies in 1926, totaling 7500 tons, consisted mainly of sheets for Arkansas, Oklahoma and Texas deliveries. A Chicago district maker of lighter finished steel products shipped 96 carloads by rail and river in the first 11 months of 1926, or more than twice the 47 carloads shipped in the 12 months of 1925.

Rail-and-river freight rates average about 80 per cent of the all-rail rates. The all-rail rate on finished steel from Chicago to New Orleans is 57c. per 100 lb., and the rail-and-river rate is 47c. From Chicago to Memphis the all-rail charge is 42c. per 100 lb. as against a rail-and-river rate of 35c. Corresponding rates from Pittsburgh are higher. The all-rail rate from Pittsburgh to New Orleans is 67c. and the rail-and-river rate is 56c. From Pittsburgh to Memphis the all-rail rate is 56c. as compared with a rail-and-river rate of 40.7c. Rail-river-ocean rates from Chicago to the Pacific Coast are too high to permit competition with shipments originating on the Eastern seaboard.

Rail-and-river shipments from Chicago to the Northwest loom up as an early possibility. River equipment of comparatively light draft is now being provided for the upper stretches of the Mississippi, and the Mississippi-Warrior Service has established a combination rail-and-river rate from Chicago to St. Paul that is $1 less per ton than the all-rail rate. Shipments of steel under this rate will be by rail from Chicago to Dubuque, Iowa, and from there by barge to St. Paul.

Shipments on the Warrior River Gain

The Birmingham district, in the South, is also making increasing use of river transportation. Formerly a producer of raw materials primarily, today this territory uses between 80 and 90 per cent of its annual output of 2,850,000 tons of pig iron at home. Its production of steel has risen to 2,000,000 tons per annum, and virtually no semi-finished steel is shipped out of the district. The rapid expansion in the production of finished products has made it necessary for Birmingham district plants to cultivate outside, as well as home, markets. In Texas and the Southwest, sections regarded as naturally tributary to Birmingham, as well as on the Pacific Coast, in Florida and in foreign countries, such as Japan and Latin America, opportunities for trade have been recognized and seized. Cheaper transportation via the Warrior River to Mobile and New Orleans is proving an aid to Birmingham district producers in their efforts to cultivate these markets.

The barge service of the Inland Waterways Corporation on the Warrior River now handles about 15,000 tons of freight per month in each direction. Normally about 60 per cent of the down-stream tonnage consists of iron and steel products, while manganese ore, sulphur for chemical plants and lumber for car works make up 50 per cent of the up-stream tonnage. Through the use of the river equipment a saving of from 5 to 20 per cent under railroad freight rates is made. Birmingham itself is not located on the banks of the river, but a railroad covering the intervening 20 miles has been recently purchased by the Government barge company. The terminal of the road, Birmingport, is 416 miles distant from Mobile, a seaport which is being developed by the State of Alabama at a cost of $10,000,000. When this work is completed, mechanical equipment will handle outgoing as well as incoming products at the lowest possible cost. Even now the facilities available, including an ore and coal bridge, load and unload barges and ships at a rapid pace. From Mobile the barge route continues by intracoastal canal to New Orleans.

The Government equipment on the Warrior River now consists of three steel towboats and 58 barges, many of the latter also being built of steel. In addition there is a small leased towboat. The growth of traffic has been so rapid that considerable tonnage offered in 1926 had to be refused, but the Government has promised to supply additional tows and barges early in 1927.

Will Stimulate Shipments to Gulf Ports

The barge service is expected to stimulate shipments of iron and steel to States bordering on the Gulf of Mexico, particularly Texas, which is a fertile market for reinforcing bars, structural steel, rails, track accessories, wire and nails. It will also be increasingly employed in connection with shipments to the Pacific Coast, which for some time has been a large buyer of cast iron pipe, structural shapes and other steel products from the Birmingham district. This material, whether shipped to Mobile by rail or barge, is carried the remainder of the distance by ocean vessel via the Panama Canal. Other shipments through Mobile include rails and other finished steel products for Japan, exports of various products to Latin America, and cast iron pipe and structural steel for the east coast of Florida.

The river service, in addition to stimulating exports, lowers the barriers to imports. In 1926 a Birmingham district steel company imported upward of 20,000 tons of billets from France, which are said to have been handled from Mobile by river barge. Several thousand tons of pig iron from England were imported during the year by a cast iron pipe company, but this material was shipped from Mobile to Birmingham by rail.

(To Be Concluded)

Warehouse Distribution Dwindling

New Competitive Conditions Create Problems for Steel Jobbers—An Analysis of Present Situation Discloses Higher Costs and Lower Profits

WAREHOUSES handling iron and steel have suffered heavy losses in trade during the past few years. Whatever benefits stabilized prices have brought to the mills, to labor or to industry in general, they have proved distinctly detrimental to the steel jobbers.

Formerly credited with distributing 10 per cent of all the finished steel rolled in this country, private warehouses probably handle somewhat less than that amount today. In fact, one authority estimates that private warehouses—tnose not operated by steel manufacturers—are doing only 50 per cent of the volume of business they handled before the war. Not only has the amount of tonnage declined, but operating expenses have mounted and the margin between costs and selling prices has steadily dwindled.

The plight of the warehouses is a result of the passing of wide swings in prices and the ascendancy of hand-to-mouth buying. With this change in market conditions, long-established trade relationships have been upset and in the confusion of readjustment certain practices have cropped out that have been hurtful to warehouses and, in some instances, to mills and consumers as well. A survey of the warehouse trade discloses that existing maladjustments are natural outgrowths of compelling economic factors. With steel capacity beyond the needs of the country, competition for the tonnage available has been keen, and mills and warehouses alike have been forced to make increasing concessions in the face of consumers' demands for service. The normal condition of the seller has been one of constant need for business. He is not in a position to set hard and fast limits on service, especially when he finds that his competitors are not doing so.

Some of the practices that have sprung up during this transition period may disappear as the steel trade finds a more settled basis for marketing its products. Other changes, according to present indications, may prove more lasting.

Distribution Costs Have Increased

One outstanding fact that cannot be overlooked in studying the warehouse problem is that the current period of stabilized prices, while conducive to economical mill operations, has increased distribution costs for producers as well as jobbers. For both there has been a marked increase in the number of orders and a proportionate decrease in their size.

Among the mills there has been a disposition to accept orders for very small quantities or orders for larger quantities covering a most varied and miscellaneous assortment of items and sizes. Some mills have attempted to limit shipments to 1 ton of a size, but for others there is virtually no lower limit to the size of an order that will be accepted from a steady customer. Orders for as little as 1000 lb. have been accepted. From individual customers without contracts mills have been known to take three to four mixed carload orders over a spread of a year.

Advantages of Hand-to-Mouth Buying to the Consumer

The small order has been forced on the mills by the disinclination of the buyer to purchase for forward needs. Not being apprehensive of price advances, he sees no need for laying in stocks. Mill bookings are not, and have not been, so heavy as to make material hard to get, and good railroad service insures prompt delivery after the steel is rolled. The release of capital formerly frozen in stocks has reduced the consumers' overhead, and smaller stocks, it has been found, are more easily kept in balance. In small supplies, moreover, the buyer sees protection from losses incident to a change in the design of his product, a contingency that may arise at any time. When large stocks are carried, they are frequently rendered almost worthless by such a change or subjected to heavy wastage if utilized. With these advantages in short-term buying, the user sees no reason for abandoning the policy. By closely checking his small stocks he can anticipate a shortage two or three weeks ahead. While he might obtain even more prompt delivery from warehouse, he prefers to buy from mill at a lower price.

Small orders are by no means confined to small buyers. Many small, mixed orders are placed by large contract customers. The mills accept them to retain the good will of buyers, entering them at current mill quotations or even at the prices ruling in the contracts. The large buyer, in other words, uses his contract as a lever to force acceptance of the small order.

When the mill is offered a small order from a small user, it is disposed to accept it in the belief that if it is rejected, some other mill will take it. Moreover, certain producers believe it good policy to cultivate the smaller customer. On this point the sales manager of an Ohio sheet company says:

> We have built up a considerable portion of our present business by starting to sell sheets in very small lots to companies that were very small customers but have grown to be such large consumers that they buy 1000 tons or more at a time. We have followed these companies along in their growth and rendered service that has enabled us to keep their business and to get larger orders as they have grown. We do not propose to abandon this method of doing business, as our success to a large extent is attributable to building up trade with small buyers who have grown to become large buyers.

Another reason that mills advance to justify the taking of small orders is that jobbers have taken what is considered mill business, having the mills make direct shipments to consumers of a portion of their contract material. One comment made on this point is that "if jobbers won't keep out of the carlot business, the mills will not quit taking less-than-carload orders." Incidentally, warehouses frequently suffer much embarrassment by encouraging customers to come to them for mill orders. While an order for a carload for mill shipment may seem desirable, the customer so served often thinks that 12,000 lb., and in some instances, as little as 2000 lb., made up of a number of sizes, should also be handled from mill.

Mill Costs Increased by Small Orders

While it is apparent that the acceptance of small orders by the mills is a natural outcome of short-term buying, there is no doubt that it has increased mill costs. Moreover, these extra costs must be absorbed by the trade as a whole. All buyers, whether they purchase in warehouse quantities or not, must bear this burden, with the result that in the long run, it is argued, they must pay higher base prices than would be the case if mills limited orders to larger quantities. The mills, according to the contention of jobbers, could prevent this economic waste by rejecting business of warehouse proportions. They would lose nothing ultimately in total tonnage because such business would be handled by the warehouses, which in

turn would buy their supplies from the mills. Furthermore, the jobbers state, their specifications would be large, thereby promoting low mill costs.

There is no question that the decline in the average size of mill orders has resulted in more frequent changes in rolls. This, however, has not been an outcome of small buying alone but also of a reduction in the size of specifications against contracts. In fact, it is difficult to estimate the proportion of total tonnage booked that is made up of small orders because contracting is at close range and specifications are small and often as troublesome as small orders. The increase in the number of roll changes, however, is by no means in proportion to the gain in the number of orders and specifications. By matching small orders with rollings made up of numerous small specifications it has been found possible to prolong the period in which rolls are in service. If a customer wants 3 tons of bars, the mill will take the order for delivery early in the rolling of the size specified. If the rolls for the size wanted are in at the time the order is placed, delivery may be made inside of a week. Except in rare cases when many sizes are specified in a small order, mills will make delivery within two weeks although tonnage on the books may indicate commitments for four to six weeks ahead. Often the small order comes from a large user who has heavy specifications at the mill. In such a case the buyer usually agrees to advanced delivery on other tonnage to permit the small order to be rushed through. In other instances, mills will run a small order on the assumption that larger specifications by other buyers are being taken at a faster rate than needed and that a delay of a day in their delivery will not inconvenience them. Only a few hours on a mill, it is pointed out, will take care of a great many small orders.

Switching Costs and Quantity Extras

Producers take the attitude that small orders do not cost any more at the mill than large orders, provided that mill sizes are specified. The extra cost comes in obtaining the order and routing it. In fact, the paper work costs as much for a small order as for a large one. On a mixed order, delivery promises usually make allowance for the time consumed in switching a railroad car from one mill to another. The switching cost should properly be charged the customer, but in view of the severity of competition, no producer has seen fit to do so. For the same reason, no doubt, the mills have failed to charge quantity extras for mill sizes, except in the case of bars and small shapes and sheets. They admit the propriety of such charges, but have not taken the concerted action necessary to put them into force. Jobbers contend that if the mills maintained rigid quantity extras, 20 to 30 per cent more tonnage would be thrown to the warehouses, which would permit them to render service to their trade at less cost than at present.

Competition from the Mill-Owned Warehouse

In comparison with recent post-war years some of the leading warehousing interests of the country had a fairly satisfactory business in 1926. They report that the volume of tonnage was steady and that in most districts warehouse differentials over mill prices were fairly well maintained. Other factors in the jobbing trade, however, report further recessions in business. For one important company, for example, warehouse bookings in a northern Ohio territory in 1926 were only 65 per cent of the 1925 volume.

Whether or not the warehouses are continuing to lose ground, it is evident that the competition confronting them is exceedingly severe and that it is not confined to the mills proper. For the privately owned warehouse competition from the mill-owned warehouse is a problem of growing importance. Such warehouses have the advantage in that they can better anticipate future requirements, having at their command specific details regarding mill bookings. Furthermore, they are undoubtedly better supported by the mills, both with respect to quantities and deliveries specified in orders placed for rolling. While the mill warehouses charge the same prices for service as the independent companies, they are able to spread any losses incident to their jobbing operations over the many stages of operation from the ore down to the finished product. The losses, nevertheless, must be borne by the industry at large, and it is charged that in the final analysis all buyers from mill, the independent warehouses included, must pay them. From the standpoint of sound business, it is contended, there is no more reason why the mill warehouse should be operated at a loss than the mill end of the business itself.

Selling Warehouse Stock at Mill Prices

The alleged failure of the steel company warehouse to get prices high enough to net a fair profit on its investment is one of the reasons advanced by the independent jobbers for their own inability to operate profitably. The community of interests of the mill and its warehouse not only results in insufficient concern regarding warehouse profits, it is said, but also frequently leads to the demoralizing practice of selling warehouse steel at mill prices. In taking a small order, it is asserted, the mill, for economical reasons, usually produces more than the order calls for, placing the surplus in the mill warehouse. For the sake of an illustration, let it be assumed that a customer providing enough business to go direct to the mill with his orders finds himself in need of a small lot of bars in a size that cannot be scheduled and rolled promptly enough to suit him. The mill salesman, it is said, usually knows what is in the warehouse stock, and to get the order or to keep the customer satisfied will exert every possible influence to get the steel shipped from the warehouse. When the steel is shipped from stock, however, it is not at the warehouse price but on the mill base.

The warehouses are also encountering competition from companies consuming steel in the manufacture of their products and from fabricators whose plants are not fully occupied in their own particular activity. Sales by such companies are primarily from stocks carried for their own use, and there is no attempt to render a complete warehousing service. The incentive for these ventures into warehousing is that sales can be made with little increase in overhead and without additions to the sales organization. In some cases their solicitation for business has been very active.

Warehouses Feel Foreign Competition

In cities along seaboard, particularly at such points as New York, Boston, Philadelphia, New Orleans, Houston and Galveston, Tex., and San Francisco, the warehouse situation has been complicated by imports of European bars and shapes which have been sold from warehouse without regard to the American steel prices. For example, steel bars from domestic mills delivered to a Philadelphia warehouse have cost from 2.22c. to 2.32c. per lb., and with the usual jobbing differential added, the sales price which some distributers have attempted to obtain is not less than 3c. and up to 3.10c. and 3.20c. However, foreign bars have been sold out of Philadelphia warehouse at $5 to $8 a ton below these prices. A similar situation has existed on structural shapes.

In the New York district a warehouse was recently opened which stocks foreign steel exclusively, making competition more difficult for those preferring to handle American steel. Birmingham mills have shared with importers of foreign steel the business of warehouses at such points as New Orleans and Mobile, but in Texas foreign steel has had almost full sway, as the high freight rates from nearest mills make it difficult for domestic producers to compete with foreign steel without sacrificing too much of their sales prices. On the Pacific Coast also importers have cut into the business of local warehouses, especially in merchant and reinforcing bars and small structural shapes.

Warehouse Costs Increase

Various factors have operated to increase warehousing costs. One jobber states that the cost of handling steel has increased more than 100 per cent in the last few years. Among the causes for higher costs are a reduction in the volume of steel distributed

and a decrease in the average size of orders. The average size of orders for an important warehouse that does not cater to the very small customers has declined from 1 ton to one-half ton. For jobbers handling all classes of trade the average order is undoubtedly smaller.

Moreover, the tendency to order in small lots is steadily increasing, and bars, sheets, plates and structural shapes must be cut to specific lengths more than ever before. Small orders mean increased sales effort, more paper work in the accounting and order departments, heavier handling costs in the stock rooms and greater expense in delivery. To illustrate the shipping expense, a warehouse recently loaded a 5-ton truck with material for 25 different customers, and it took an entire day for the truck to make the deliveries. In the face of this increase in costs buyers at greater distances are constantly demanding the extension of free delivery limits.

Jobbing of Pipe Holds Its Own

Changes in market conditions in recent years have affected warehouse business in some products more than in others. A very large percentage of the steel pipe produced is marketed through jobbers, and there are no signs of any marked deviation from this method of distribution. Many of the larger pipe distributing companies are offshoots of the pipe manufacturing companies. Others are regular distributing agents for certain mills. One great advantage in handling pipe in this manner is that it relieves the manufacturers of the need for assuming financial risk. In the case of the large oil and gas companies the mills deal direct with the customers, but for every large oil and gas company there are as many as 10 small ones, and to handle so many small accounts would burden the mills with endless detail.

In standard-weight pipe, which constitutes about 40 per cent of the total output of welded pipe, sales are entirely through jobbers. For distributing this class of pipe one large manufacturer has a long list of consignee jobbers, who handle the pipe on a commission basis, reporting sales and shipments monthly and then getting sufficient shipments during the ensuing 30 days to restore a full stock. As against the regular jobbers' discount of 1 and 5 per cent beyond the card discounts, the consignee jobbers get an extra 2½ per cent. They have no control over resale prices, which are named by the real owner of the pipe, the consignor. Another important pipe maker a year or so ago adopted the same method of distributing standard-weight pipe, and if others are not doing it formally, they at least have what they regard as their regular distributers.

For the sale of oil, gas and line pipe there are a number of large supply companies, some of which are controlled by mills. These supply organizations have as many as 200 warehouses scattered through the country and, with their specialized sales forces, remove from the shoulders of the manufacturers a heavy burden in sales and other distributing expense.

Warehouse distribution of cold-finished steel bars, screw stock and shafting is protected, to a large extent, because there are many users whose requirements are so small that interest and storage costs would eat up any saving that might be made through large-lot purchases. While it is believed that cold-finished steel bars will continue to be sold through warehouses profitably, there will always be some mill competition for warehouse lots, especially in lean times in the automobile industry, which takes 50 per cent or more of the total production.

Severe Competition in Sheets

Consumers using sheet steel in a small way still depend mainly upon the warehouses. The requirements of sheet-metal contractors, hot-air furnace builders and others do not warrant large purchases. Jobbing of sheets is by no means free from difficulties, however.

In an important Ohio consuming district, mill competition for orders of warehouse size has been keen. Mills, as a rule, are opposed to taking less-than-carlot orders, although a few will do so to oblige a customer. Jobbers in this district ordinarily do not ask mills to make direct shipments to customers for less than 5 or 10 tons except for sizes that they do not carry in stock. There are some small mills, however, that will accept orders for around 5 tons for quick shipment either from mill stock or for rolling. Mills that follow this practice usually name a quantity differential of 10c. for 2500 to 5000 lb. of a size, 25c. for 1000 to 2500 lb. and 50c. for 1000 lb. or less. Such differentials, the jobbers complain, would not permit them to live.

The practice of making direct shipments to a consumer from mill is rather common among jobbers in this territory. For example, a jobber may contract with a mill for 100 tons per month and after taking some of the material for stock may ask the mill to make direct shipment of the remainder to a consumer at around $2 a ton above what he paid the mill. While jobbers prefer not to do this, once it is done by one warehouse, other jobbers feel that they must follow suit.

A common complaint among sheet jobbers is that there is not enough spread between mill prices and warehouse prices. One warehouse interest in this district states that because of this small margin he has quit handling sheets outside of seconds. Incidentally, the warehouses complain because there is an increasing tendency on the part of mills to sell seconds to consumers at the same prices that they are sold to jobbers.

Another development that has complicated the jobbing business has been the appearance of companies that buy surplus mill stocks in all grades and sizes, which they sell both to regular jobbers and to consumers. These stocks contain some material that has grown rusty, and this is sold at prices well under regular prices, thereby tending to demoralize the market.

In the heavier finished products—plates, shapes and bars—warehouses have encountered very severe competition. The comment of one well informed observer is that sales of these products through privately owned warehouses will probably continue to wane unless through consolidation the requirements of individual jobbers become so large as to permit them to buy the steel at preferential prices.

Wire nails are sold mainly through jobbers, although large retailers placing carloads have succeeded, in many cases, in getting the same prices as the warehouses or are asked only a small advance.

Effect of Shifting of Price Bases on Jobbers

The shifting of bases as a result of compliance with the Pittsburgh "plus" order has undermined some of natural protection afforded jobbers, especially where freight rates from Pittsburgh were based upon combinations. This is markedly the case in Western territory and even as far south as Birmingham, but it is not true in the East, where jobbers never were afforded protection by combination rates as distinguished from local rates.

The situation is most notably characterized in wire products. It will be recalled that the upshot of the Pittsburgh "plus" order was the establishment of multiple bases, including such points as Cleveland, Waukegan, De Kalb, Anderson, Duluth. Some of this territory and tributary districts took rates from Pittsburgh made up of local rates to these points and beyond. Accordingly, the jobbers at or near these points had the protection of the difference between carload and less-than-carload rates. When the new price bases were established, jobbers at these points were naturally compelled to reflect the reduction in prices.

The effect of the new mill bases, therefore, has been much more pronounced in territory west of Pittsburgh than elsewhere. Under the new bases the difference between the price paid by the jobber and the price he can command is so narrow, often only 5c. per 100 lb., that he cannot profitably do business. The margin

represented by the difference between carload and less-than-carload rates, on the other hand, would easily range from 25c. per 100 lb. up.

Suggested Remedies

Various remedies for the present ills of the warehouse have been suggested. The one sure cure, of course, would be a change in market conditions that would bring hand-to-mouth buying to an end. Other suggestions call for voluntary changes in the policies both of mills and warehouses. To what extent such changes can, or will, be made under keenly competitive conditions is, of course, questionable. The mills are urged to establish and adhere to restrictions that would prevent buyers from pressing them with undesirable business. At the same time, it is suggested, the producers should educate the customers, especially the larger ones who, in their constant efforts to obtain lower contract prices and thereby reduce their raw material costs, should be interested in keeping mill costs at a minimum. The general application of mill quantity extras, it is contended, would turn losses into profits and, if they were in line with warehouse extras, would divert much of the undesirable small-tonnage business to the jobbers.

The warehouses, on the other hand, are asked to discontinue granting extra services without compensation and to refrain from taking orders for direct mill shipment. A prominent jobber says:

"The remedy for many of these conditions lies in the accumulation of knowledge by associations of concerns in the warehouse business. The opportunity is thus given to study the facts which are made available by the free interchange of information on the part of the members. It should not be necessary to say that the prime requisite is the development on the part of every concern of a sense of interdependence and unselfishness."

Progress in Standardization

Work Accomplished in Industrial Field During 1926 Includes Steps Taken Toward International Uniformity

DEVELOPMENTS in the industrial standardization movement during 1926, as outlined by the American Engineering Standards Committee, include important progress in the mechanical and mining industries and in industrial safety. The movement has been further extended through management and trade association activities, and forward steps in international cooperation have marked the past year.

There is increasing tendency for industrial executives to provide a definite organization for their standardization work, rather than dealing with it as a more or less incidental function of the engineering and production departments. Active cooperation among companies in furthering standardization work is also stressed in the committee's announcement.

International conferences on standardization, held in New York during April, were a feature. Two of these were meetings of the International Electrotechnical Commission, with its group of technical committees, and the third conference of the national standardizing bodies. Topics at the latter conference included screw threads, ball bearings, gages and preferred numbers.

Progress in international uniformity in industrial practice was made at each of these conferences, at which 20 countries were represented. A basis was laid for what it is hoped will soon become a unified international standardizing body covering the general field of industrial practice. The relation of the International Electrotechnical Commission, a specialized organization, to a general standardizing body, into which work from the national industrial standardizing bodies shall feed, is stressed as of special importance in this country.

Certification Plan Proposed by Standards Bureau

The progress made by the Division of Simplified Practice of the Department of Commerce is noted in the committee's announcement, it being stated that about 50 simplifications have been carried through. More than 400 specifications have been approved by the Federal Specifications Board, but it is said that much remains to be done in thoroughly coordinating these specifications with those in general use in industry.

A plan of certification proposed by the Bureau of Standards is outlined in the report. Under this plan any manufacturer who is willing to supply goods made to comply with a Government specification may file with the bureau a statement to that effect. A list of such manufacturers will be given to consumers requesting it. This plan has been discussed by a number of organized industrial groups because of its possible far-reaching effect upon sales policies and method of distribution.

Mining standards formally approved include safety rules for installing and using electrical equipment in coal mines. The work of the sectional committee on drainage of coal mines, and outside handling equipment and wire rope for mines, has been completed and will be submitted shortly to the A. E. S. C. for approval.

An important project, which is being considered as a result of a meeting of interested groups, held during the conference on bituminous coal in Pittsburgh, Nov. 15 to 19, 1926, relates to the classification of coal as a basis of commercial transactions. The work will cover all grades of coal from lignite to anthracite.

Mechanical Standards Work Extensive

Mechanical standards being developed under the procedure of the A. E. S. C. are extensive and plans are under way for the organization of an advisory committee to coordinate the various parts of the work.

A tentative American standard for tooth form of spur gears has been submitted for the formal approval of the A. E. S. C. Several sections of the work on bolt, nut and rivet proportions and of pipe flanges and fittings are near completion.

Specifications for railroad ties, satisfactory to both the steam and electric railroads have been agreed upon during the year, and specifications for tubular steel poles and for girder rails have been unified and approved as tentative American standards.

Of the 50 codes on the national safety code program, 20 have now been formally approved by the A. E. S. C. Revision of the National Electric Code is an outstanding development. Upon the initiative of the state industrial commissions, arrangements have been made for a revision, under the procedure of the A. E. S. C., of the standard plan of reporting and compiling accident statistics.

New Spirit of American Industry

Cooperation Between Management and Men Gives Worker a Greater Incentive—A Glance Into the Past and Future by an Industrial Leader

BY GEORGE M. VERITY

WHERE just a generation or two ago it was every fellow for himself, industry today is assuming a degree of responsibility in national, State and community life such as was never dreamed of in the past. The new American spirit of cooperation, one of the great outcroppings of our national life, has changed the whole aspect, operation and ultimate aim of industry.

Where the management of industry was formerly the carrying out of a selfish purpose, it has now become a public trust. This is most clearly exemplified by the administration of the affairs of the largest industry in the world, the United States Steel Corporation. Judge Gary has done a great deal in support of a live and let live policy. He has supported the policy of an equally fair consideration of the rights and best interests of both the worker and the stockholder. His attitude toward the public and his business policies as a whole have placed industry on a higher plane in the minds of our citizenship at large.

Living and working conditions have become immeasurably improved in the past 25 years. It is not so long ago when any sort of a place was considered good enough for the worker and if, because of living or working conditions or for any other reason, his service was not satisfactory he was simply discharged and someone else put in his place.

Today industry has come to realize fully that the worker should in reality be a partner; that his personal welfare, his home surroundings and his state of mind and heart have everything to do with his spirit of cooperation and with his efficiency. In this day and age efficiency is a factor to be reckoned with and it is not possible of attainment without the confidence, good will and cooperation of the "men behind the guns."

Greater Incentive for the Worker

These changes in understanding and policy have resulted in giving the individual worker a new relation and a new and greater incentive for worth-while accomplishment. Industry has gradually smoothed out the misunderstandings that formerly existed between so-called capital and labor, as today most of the old basic antagonism has disappeared.

Humanics, the science of handling and developing of men, is now as much a part of the work and responsibility of management as are the production and the distribution of product.

A good visualization of the status of capital and labor in America as viewed in Great Britain is contained in an article entitled "The Causes of American Prosperity," which recently appeared in an English periodical. This statement was written by Philip Kerr, who was secretary to Lloyd George while he was prime minister during the war:

> I have just returned from a trip to the United States and I should like to put before the readers of the nation certain impressions which I gained there about our economic problems. One striking conclusion stands out in my mind. The root of Great Britain's economic difficulties is not the conditions created by the war, for these are passing away, but the irreconcilable conflict of idealism and conviction between capital and labor about the fundamental principles upon which industry itself should be conducted.
>
> The foundation of the prosperity of the United States is not its natural resources, although these are of great importance, but the fact that there is almost complete agreement between capital and labor as to the basic economic principles which must be followed if the whole community is to enjoy full employment at a steadily rising standard of living.

Worker Assuming a Share in Capitalizing Industry

Evolutionary changes in our economic development have gradually brought about a condition where the capital absorbed by industry is supplied by the masses instead of by a few capitalists as it was in the earlier days. The number of stockholders in corporations of all kinds has increased by leaps and bounds until it is now estimated that there are more than 15,000,000 persons owning corporate securities. When one stops

GEORGE M. VERITY, president American Rolling Mill Co., Middletown, Ohio, for more than 35 years, has been noted for his intense interest in the upbuilding of the close relationship and cooperation between management and men—a relationship which Mr. Verity describes as "the new spirit of American industry." The American Rolling Mill Co. has been a pioneer in the fostering of mutual helpfulness in the plant and in the community, and the success of its efforts have been dwelt upon in THE IRON AGE.

Looking to the future, Mr. Verity tells in this article what he regards as the important achievements to be aimed for in a furtherance of the new partnership of capital and labor. He speaks with the authority of 40 years of business experience, having been in some branch of the steel business since 1889. His business connections include directorship in the Westinghouse Electric & Mfg. Co., and in banks and a rubber company. He is a member of the advisory board of the National Industrial Conference Board.

to consider that there are only 25,000,000 families in the United States and some 43,000,000 active workers, it is easy to see what a large proportion is interested in the organized business of the nation.

There are, for instance, 966,000 owners of securities in our railroads alone, and the American Telephone & Telegraph Co. has 363,000 stockholders.

This very radical change in the ownership of corporate securities and particularly in the control of our larger business units has resulted in the revamping of the policies affecting the worker, the stockholder and the public at large. The executive heads and managers of business are today simply trustees for all those affected by its activities.

Other Problems of Industry

Still broader, sounder and better policies are needed to meet the complex demands of modern business. It is a problem of industry and one of its greatest responsibilities to be constantly striving for every reform that will contribute to the stability of business generally.

Another great problem in industry that must largely be governed by company policy is the constant necessity of obtaining the best possible balance between consumption and production. That degree of efficiency which makes for excess production in a given industry at a given time may play havoc with commercial conditions.

As against that undesirable result the management of an industry is faced with the problem of holding its own in its particular field, of keeping up with advanced production methods, of securing a maximum production from its operating units so that both proper costs and adequate returns may be enjoyed.

In this great, growing country, where every established industry is gaining ground steadily, it would seem that the steady increase in demand over any period long enough to be used as a yardstick would take care of the problem, but the amount of ingenuity, of resourcefulness, of push and courage that is injected into an industry in typical American fashion by each of the units engaged in that industry can easily result in a greater total production than can be immediately absorbed. These recurring conditions right themselves in time but they certainly add greatly to the responsibilities of management.

The progress of industry, like that of human life itself, follows a curved line. That seems to be a law of nature. Nevertheless, industry must do all it can to straighten out that line by lengthening the swings between the peaks of consumption and production.

Greater stability means steadier employment and more economical operation in every direction. Industry has already accomplished much in that respect through elimination of waste, of extravagance and of inefficiency of every sort.

The present policy of buying for immediate needs, made possible by increased efficiency in transportation, has proved a help instead of a hindrance as at first feared.

Importance of Industry in Our National Life

Industry is such a large factor in our national life that its success or failure is a matter of great concern, not only to all those directly engaged in it, but to its backers and supporters, its clients and to our citizenship at large.

Because of its wide influence over our whole national prosperity, the basic problems involved and the factors that make for its permanent success should be better understood by all business men. They should be understood especially by all of our financial institutions.

With the remarkable history of American industry before us, if one has confidence in the future of America, he certainly should believe that our basic industries stand among the permanent institutions of this civilization.

As life goes today we are apt to take a speculative view of all business based on the happenings of the day, just as though conditions existing in any one day, in any one month, or in any one year could have a decided influence on the life of any particular well established business. As business men we need to look more to average results secured over a substantial period, rather than to those of the particular quarter in which we happen to be working.

The trend or progress of any particular unit in industry cannot be soundly judged unless a period of at least five years is considered. Business will always show more or less of a curved line, but history has shown that in our American business life the upgrades largely overshadow the down-slides and that periods of progress are of greater duration than those of depression.

This does not agree with the theory of the professional business forecaster that reaction follows action in equal degree. I do not subscribe to that theory, as I do not believe that life in any of its phases can be accurately or systematically charted. In some respects I feel that business is charted and forecast by the professional guesser much to its detriment.

American industry, with its many factors of strength, with all of its penalties and rewards, with all of its responsibilities and accomplishments, has developed and maintained one great factor for basic stability: its general economic policies come more nearly to conforming to a sound economic program than do those of any other country in the world.

Looking Into the Future

Mass production and the application of every invention or development that will make for low costs are essential for the preservation of our present standards of living.

The highest possible standards of wages are also an essential as the buying power of the masses is now necessary to sustain the vast scheme of mass production.

Every standard of efficiency that we have attained must be maintained and increased when and where possible.

Research work must be continued in ever-increasing degree.

Industry must stand ready to occupy the new fields that will constantly be opened by science.

Some measure of regulation of the production and commercial policies of industry that will make for greater stability is, of course, the great need. Under the present order of things, that is neither humanly nor legally possible of accomplishment.

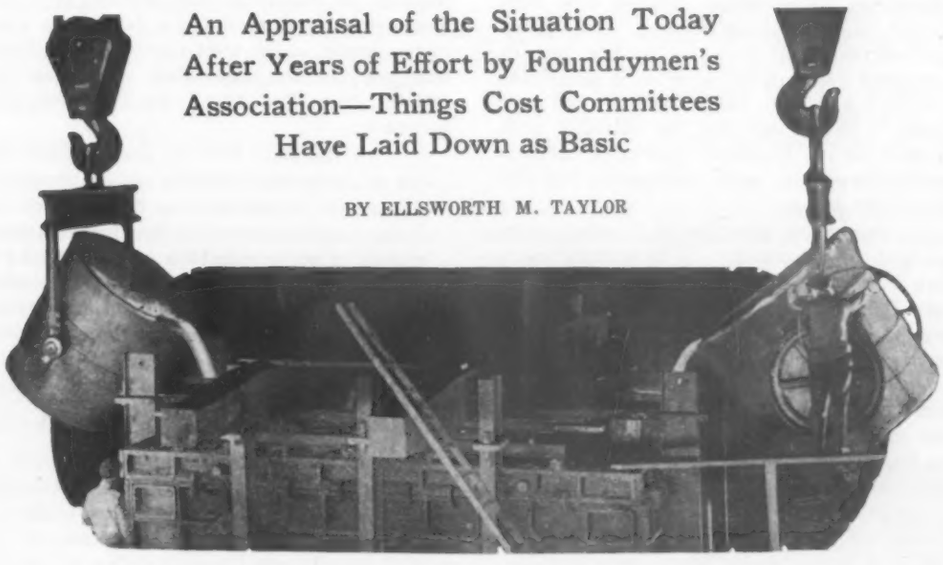
In the light of our experiences during the past 25 years it would seem that the only open road to greater stability in that respect is the gradual integration of production forces so that the number of manufacturing units in any given line will be reduced to a point where the responsibilities of each management will be so proportionately increased that greater stability will be the natural result.

In the development of the corporate form of business and of so-called big business time has proved that the larger enterprises must be handled more carefully and sanely than the smaller ones and that they cannot ignore the fundamental laws of economics.

Do More Foundries Know Costs?

An Appraisal of the Situation Today After Years of Effort by Foundrymen's Association—Things Cost Committees Have Laid Down as Basic

BY ELLSWORTH M. TAYLOR



THE ever present question of uniform or standard foundry costs was one of the most important to receive attention from the American Foundrymen's Association during 1926. This subject has been considered almost continuously by the association over a period of 18 years, since 1908 to be exact, to the personal knowledge of the writer. Its persistency, its refusal to die a natural death, is indicative of its intrinsic value. It is of vital importance to the industry.

Conversing on this subject of foundry costs, a gentleman of knowledge and reputation in matters relating to the iron trade recently remarked that he did not know why, but that about all a man with some mechanical knowledge of making castings had to do was to shout the word "foundry," and immediately sane people would hand over their money to start a new enterprise, or prolong the life of another, without any idea of what the true costs of the castings are or are likely to be. Result: many a headache on the morning after, not only for the investor but for all foundrymen operating with a knowledge of what their true costs are, who are forced to face this wild-cat competition, while it lasts.

What Progress in Knowing Cost of Castings?

But what is the situation in the industry today in regard to this question? What progress has been made in, say, the last three years, toward establishing uniform or standard foundry costs? Is there any marked increase in the interest shown by foundrymen in the matter? Are more of them realizing the seriousness of the situation, the losses sustained by ignoring the question? Are greater numbers actually taking steps to know what their true costs are? If not, why not?

First as to increased interest in the subject: The executive department of the American Foundrymen's Association, which is probably as closely in touch with developments in the last three years as any organization, states that while there has been a real interest in the cost sessions at the annual conventions, the association has very little in the way of reliable statistics by which to gage any progress in the matter that may have been made in the foundries of the country during this period. So we shall have to content ourselves with the knowledge that interest is shown by many foundrymen in cost keeping methods, even though we cannot tell how much this interest has increased.

Foundrymen's Association Questionnaire

The next thing to consider is, What is the situation in the industry today in regard to this question of foundry costs?

In March, 1926, the American Foundrymen's Association at the request of its Cost Committee sent out a questionnaire to 1200 members who operate foundries, asking whether they kept cost records and had a cost system in operation in their plants. In all 597 foundries replied, of which number 442 were listed as having dependable cost information. That is, out of 1200 foundries addressed it was possible to list 442, or about three-eighths, as having dependable cost information. This list included all types of foundries, grouped by the association under the headings: (1) Gray iron, (2) Gray iron and non-ferrous, (3) Non-ferrous, (4) Steel, (5) Gray iron and steel, (6) Malleable, (7) Gray iron and malleable.

There are estimated to be approximately 7000 foundries of all kinds in the United States and Canada, the territory covered by the questionnaire of the association. It is fair to assume that the ratio of foundries, both within and without the association, not having dependable cost information is the same. On this basis there are some 4500 foundries operating in the United States and Canada that have no dependable cost information.

Almost unbelievable, is it not?

Getting at the matter from another angle, an executive officer of another foundry trade association is quoted on page 989 of the Oct. 7, 1926, number of THE IRON AGE as saying, "At least two-thirds of the jobbing foundries of the country have no dependable cost information."

These two sources of information, entirely independent of each other, indicate that of the entire number of foundries of all kinds in the United States and Canada there are today something like 5000, or from 60 to 70 per cent, operating without dependable cost information.

Wide Variation in Bids on Castings

Here is a staggering situation, to express it mildly, and one which is fairly reflected in the following

incident related at the cost session of the American Foundrymen's Association in 1925 at Syracuse. The Cost Committee caused requests for bids on a hardware casting weighing 4½ lb. to be sent out to a number of foundries, all of which believed they were bidding on a job that somebody wanted. The prices named ranged all the way from 5c. to 12c. per lb. The Cost Committee does not tell us what it considered the correct price, but it does say, "Certainly we need some uniformity." It is clear that the industry, with some 70 per cent of its foundries operating without dependable cost information, needs uniformity, but *uniformity on the right basis.*

And what is this whole question of foundry costs, uniform, standard, or otherwise? It is nothing more nor less than common sense, just plain, ordinary "horse" sense. It is putting things where they belong. It is dividing the items that are consumed in the making of castings into certain groups, and reducing the total money in each group to certain units, which, when you know the weight of the casting and the length of time taken to make it (as measured preferably in hours, but oftentimes just as accurately for all practical purposes by the labor cost) enable you immediately to figure costs of individual castings, costs by certain classes of castings, or costs by customers, whichever way you have decided meets your requirements.

Common Sense a Prime Factor

Anything especially hard or difficult about this? Not when it is done on a common sense basis. Is it expensive to operate? No. If done on a common sense basis, it seldom requires any extra clerical help, or little that amounts to anything. In a word, the whole question of foundry costs may be described today, just as I defined it in an address to foundrymen some 20 years ago, as one of "straight-line simplicity."

Then why is it that some 70 per cent of the foundries of the country still, at this late date, are operating without dependable cost information? Principally, in the writer's opinion, because of a fear of "red tape." Or to quote from page 146, vol. 33, of the 1925 Proceedings of the American Foundrymen's Association: "The alibi is, 'We cannot afford to have a lot of clerks around here'." In other words, the foundryman has not as yet been brought to realize that the whole question of foundry costs is one of common sense and "straight-line simplicity," and should not require a lot of clerks.

Associations at Work

There are at least three associations allied with the foundry industry which are today actively working on this problem for the foundrymen's benefit—the American Malleable Castings Association, the National Founders' Association, and the American Foundrymen's Association.

It is interesting to note that recently the first two of these associations—the American Malleable and the National Founders'—have been working on the same type of foundry, the small foundry. THE IRON AGE on page 989 of its issue of Oct. 7, 1926, refers to the presentation of a paper by an officer of one of these associations covering the "Cost Procedure Primarily for Gray Iron Foundries of the Smaller Size." A representative of the other association in a recent talk on foundry costs stated that his efforts were being centered on costs for *the small jobbing foundry.*

The 1926 Cost Committee of the American Foundrymen's Association, even before this review of the situation is printed, is scheduled to make some recommendation to the board of directors as to the action that association should take in the matter. It is to be hoped that the association will center its activities on the *individual types and classes* of foundries, as in the writer's opinion this is the only safe and sane solution of the problem.

A temporary digression from the individual type method of handling the matter by the American Foundrymen's Association a few years ago, according to the report of the 1924 Committee on Foundry Costs, was not the solution. This committee is quoted as follows, from Vol. 32 of the Transactions of the association:

> "In the year 1919 an arrangement was made by the directors whereby a cost system, devised by a firm of accountants for some of our members, could be installed by that company in the plants of other members at an agreed price, and this system was printed in the Transactions for that year. *It was somewhat elaborate and went into considerable detail in the analysis of accounts, so that it did not seem to be well adapted to the average foundry.*" (The italics are mine.)

Bulk Methods Do Not Meet the Case

There are two things that stand right out in this statement by the committee. The first is that it is not practical to take a cost system off the shelf in its entirety, like so much canned goods—no matter how good it may be—and install it "as is" in other plants. This is particularly true of the foundry industry. The second is that if you wish to convert any great number of foundrymen to the use of correct cost methods it is necessary to cut out elaborate details and get right down to fundamentals.

Otherwise you are trying to convert about 70 per cent or 5000 members of the industry to the use of correct methods by showing them a lot of elaborate detail, many features of which may not even apply to their particular type of foundry at all. Such detail means nothing to them except "red tape" and extra clerical help, the fear of which, although it may be mistaken, is the very thing that keeps many of them from doing anything at all toward getting correct costs.

The 1924 committee's report, passing over the 1919 incident above, states that the 1922 committee endeavored to devise a simpler system which could be expanded for the use of the larger firms or contracted for the use of smaller ones. This system, the 1924 committee says, was not generally adopted, but was a step in the right direction. I will not question the wisdom of the committee in this statement.

The 1924 committee then continues with a review of its own work. After the experiences of 1919 and 1922, cited above, the 1924 committee decided that its first task was to analyze the situation carefully. As a result it found *that the foundry industry was composed of many types of foundries, and that conditions varied greatly in the different classes, so that it would be impossible to devise a cost system which would apply to all.* It then decided to start at the bottom and find out what was common to all and it determined on a number of fundamental principles which it felt applied to the foundry industry as a whole.

The 1924 Committee's Fundamentals

The committee then set down the following fundamental principles:

> Cost factors should be distributed departmentally so far as practicable.
>
> In figuring the costs of individual castings, classes or customers, certain expenses should be applied specifically.
>
> The expenses which cannot be charged directly should be applied
>
> (a) Partly on the basis of direct labor
>
> (b) Partly on a basis of a uniform cost per lb. of good castings produced.

The conclusions of the 1924 committee, in respect to its above-stated analysis of the situation and the fundamental principles it recommends to the industry as a basis for the upbuilding of all foundry cost systems are, in the opinion of the writer, absolutely sound and correct, and it is hoped will not be disregarded by the 1926 committee which, even before this review is printed, may have made some further recommendations to the board of directors.

Five Groups of Foundries Covered

While placing the stamp of approval on the deductions of the 1924 committee the writer has before him a transcript of the proceedings of the convention of the American Foundrymen's Association held at Toronto in 1908, eighteen years ago. Included therein is a paper, contributed by the writer, under the following title: "Uniform Foundry Costs—A Memorandum Prepared in Connection with the Chart Submitted by the Cost Committee of the American Foundrymen's Association."

A re-reading of this paper today, eighteen years after it was presented to the foundry industry, gives us, among other things, the following summary of costs, the details of the various subdivisions being subject to change "to meet individual conditions":

Cost of Metals Used
Cost of Applied Labor
Cost of Total Sur-Charge divided into
(a) Cost of items to be distributed as surcharges or burden on metal, distributed on basis of weight of good castings
(b) Cost of items to be distributed as surcharges or burden on basis of per cent of applied or direct labor.

Then follows the statement that the summary illustrates "the classification of costs necessary for all kinds of foundries, and must be used to meet the conditions in the five general classes of foundries described below, and all others."

The five general classes of foundries are given as follows:

(1) Small jobbing foundry selling its entire product to the trade.

(2) Jobbing foundry large enough to be divided into two or more distinctive departments.

(3) Foundry selling its entire product to its own machine shop.

(4) Small foundry selling part of its products to the trade for cash and the balance to its own machine shop.

(5) Large foundry capable of sub-division into departments and selling part of its product to the trade for cash and part to its own machine shop.

Under each one of the foundry headings above a little comment and a formula are given, suggesting how the summary of costs may be applied to that particular type of foundry.

I am introducing these facts from the recommendations made to the foundry industry through the American Foundrymen's Association in 1908 to show how closely they coincide with, and to give more stability to, the deductions of the 1924 committee, who make no mention in their report of there ever having been a cost committee of the American Foundrymen's Association prior to 1919; also that the foundry industry and the men in it who are striving for increased interest in cost matters may know that in the judgment of two different sets of men, 16 years apart, it is a mistake to advocate the adoption of anything more than correct fundamentals for uniform costs in the industry; that both sets of men are agreed on the fundamentals which are correct; further, that the individual foundry should be departmentized when a wide variation in the kind or classes of castings produced makes it necessary, or for some other common sense reason—for example, when part of the production is "plain" castings and part "cored" work, or when part is floor work and part machine work, or when the physical layout of the plant demands it, etc.

About 70 Per Cent of Foundrymen Are Yet to Be Won Over

The present article is a review of the cost situation in the foundry industry and no attempt will be made to enter into cost details. The problem facing the industry is to convert about 70 per cent of its mem-

THE author, whose activities in the development of foundry cost systems extend over the past twenty years, set out to review the results of the more recent efforts of foundry associations to establish standard systems of costs for the manufacture of castings. In quoting testimony he cites the statement of the secretary of the American Malleable Castings Association that "at least two-thirds of the jobbing foundries of the country do not know when they quote on work whether or not they can reasonably expect a profit."

Passing to the work of the Cost Committee of the American Foundrymen's Association, Mr. Taylor gives the results of a questionnaire which brought definite evidence of the keeping of dependable cost information by only 442 foundries out of a total of 1200 addressed.

Mr. Taylor considers the problem before the foundry industry today to be the conversion of something like 70 per cent of the makers of castings to the use of dependable cost methods. He points out that the average foundryman's fear of red tape is the chief obstacle to be overcome.

bers to the use of uniform cost methods. To do this all semblance of red tape must be cut out, and the use of correct fundamentals must be urged. After 16 years the American Foundrymen's Association, through its 1924 Cost Committee confirms and re-accepts the recommendations made to the association in 1908.

The decks are now all clear for action. Draw up a set of fundamentals for each one of the five different types of foundries named in 1908, and as many more as may be necessary to cover the field, if this action will help the cause along; but do not attempt to make one layout which obviously, to be complete, would have to cover the foundry with the greatest possible number of departments and complications, do for all. Many a foundryman with a foundry of smaller type, if shown a layout of this kind, with the statement that all of this does not apply to him, but that by cutting out this, that and the other thing it will fit his needs, will take one glance at all the complications, raise his hands in holy horror and say, "None of that in mine."

And in seeking uniformity the correctness of the details of the items which go to make up the fundamental units in each foundry must not be lost sight of. The same material may have to be distributed to a different fundamental unit in different foundries. This point is well brought out in a paper by C. W. Grant on "Cost Finding in a Foundry," page 79, Vol. 32, of the Transactions of the American Foundrymen's Association. The author says:

> "The fact should be constantly borne in mind in adopting uniform methods of cost finding that different operating conditions exist in different plants and uniform methods should not be carried beyond their practical limitations. For instance, it is good practice for all foundries to distribute labor and expense to the same classification of accounts, but their application to an individual casting might be vastly different, depending on the class of work and the foundry practice employed at different plants."
>
> And again from the same paper—
>
> "The majority of foundrymen and cost authorities consider the molding labor an equitable basis for the distribution of molding indirect labor and expense. This is true to the extent of such items as vary with the design of the casting. These items of expense bear a close relation to the direct labor, but the items which vary with the weight of the casting should be applied on a tonnage basis."

In other words, this man also believes that accuracy should not be sacrificed merely to secure uniformity, and that in the foundry industry there can be uniformity only in fundamentals of costs.

The Problem of Determining Normals

The association's 1924 Cost Committee in its report in Vol. 32 also speaks of the use of "normals" in determining sales quotations, and mentions the employment of competent men to assist in the installation of any system.

These two matters are very closely related. The case is rare indeed where the foundryman is personally able to install a cost system in his plant. He needs consultation with and the assistance of the "outside" man, and one of the things the competent outside man does for the foundryman is to determine the first set of "normals" for that particular foundry.

These "normals" are the *standard units of costs* to be used by the foundryman in figuring jobs, and once established are not changed until current cost reports and records of any operating period indicate that a change is necessary. These standard units are built up on the estimated costs which should prevail in that particular foundry when operating under normal conditions. Normal operation is defined by the 1924 Cost Committee as "that percentage of full operation which will represent average business, taking into account class of work and facilities. This percentage will be somewhere between minimum and maximum and should never be maximum."

It is not the purpose of this review to discuss cost details. But in order that no foundrymen may be scared off by the introduction of the subject of "normals," I give below a few figures which are easily understood and show what a godsend these "normals" are to the foundryman when they are once established. The figures used are fictitious, and are shown as illustrations only.

A Case of the Simplest Type

We will assume the case of an iron foundry of the simplest type; that is, with no complications and no necessity for subdivision into departments.

The weight of the finished casting will be 100 lb.

The cost of the pig iron will be 1c. per lb. delivered.

Total direct labor cost 10 hr. at 90c. per hr.

The "normal" labor burden for this foundry has been fixed at 90c. per direct labor hour, or 100 per cent of the direct labor cost.

The "normal" tonnage burden for this foundry has been fixed at ½c. per lb. of net good castings produced.

The cost of this casting is figured as follows:

The cost of the pig iron for which we paid 1c., delivered, must be figured at 1¼c. per lb. in the finished casting because the loss in melt was somewhere around 5 per cent and we only got about 60 per cent of the weight in the finished casting. Hence:

Cost of metal, 100 lb. at 1¼c. per lb.....	$1.25
Cost of direct labor, 10 hr. @ 90c.....	9.00
Normal labor burden, 10 hr. @ 90c.....	9.00
Normal tonnage burden, 100 lb. @ ½c. per lb.	.50
Total cost of casting.....	$19.75

Cost per lb., 19¾c.

Labor Burden and Tonnage Burden

While we are on the subject let us give a minute's attention to the items which, in the case of this particular foundry are included in Labor Burden, and those which are included in Tonnage Burden. They are as follows:

Labor Burden Items	*Tonnage Burden Items*
Light and heat	Transportation, not already added to iron, etc.
General foundry expense	Yard items
Repairs to tools, equipment and buildings	Cupola items
Superintendence and all office items	Repairs to cupola and other tonnage equipment
Taxes	Flasks and boards
Insurance	Molding supplies
Bond interest	Shipping and receiving
Depreciation on buildings and equipment	Inspection and testing
	Shake out

Where Reckoning is by Departments

To illustrate further, we will assume the case of another iron foundry with more complications. We will assume that the nature of its production and physical layout makes it necessary to subdivide the plant into two more departments than in the case above. We have to add a Core Department and a Pattern Shop. We will assume the "normal" labor burden, and the "normal" tonnage burden to be the same amounts as in the example above, and we establish the "normal" burden in the Core Department at 50c. per direct core labor hour, or 70 per cent of the direct core labor. The Pattern Shop "normal" burden we find to be 25c. per direct Pattern Shop labor hour. Assume that the finished casting, although of a differ-

ent pattern, will also weigh 100 lb. and that all prices and "normals" are the same as in the previous case, but in addition there is a direct core labor cost of 2 hr. at 70c. per hr. and a direct pattern labor cost of 20 hr. at 45c. per hr., with a cost for lumber and materials of $5. The data may then be lined up as follows:

Pattern Cost		
Materials	$5.00	
Direct pattern labor, 20 hr. @ 45c.	9.00	
Pattern burden, 20 hr. @ 25c.	5.00	
Total cost of pattern	$19.00	
Casting Cost		
Cost of metal, 100 lb. @ 1¼c.	$1.25	
Cost of direct molding labor, 10 hr. @ 90c.	9.00	
Normal labor burden, 10 hr. @ 90 c.	9.00	
Normal tonnage burden, 100 lb. @ ½c. per lb.	.50	
		$19.75
Cost of direct core labor, 2 hr. @ 70c.	$1.40	
Normal core shop burden, 2 hr. @ 50c.	1.00	
		2.40
Total cost of casting		$22.15

Cost per lb., 22½c.

The items which are included in the burdens of these two additional departments are as follows:

Pattern Shop Burden Items	*Core Shop Burden Items*
Power and transmission	Shipping and receiving
Shipping and receiving	General shop expense
General shop expense	Superintendence, office, etc.
Superintendence, office, etc.	Core ovens
Repairs to buildings and machinery, etc.	Repairs to buildings, machinery and equipment
Taxes	Taxes
Insurance	Bond interest
Bond interest	Depreciation on buildings
Depreciation on buildings	Depreciation on equipment
Depreciation on equipment	

So much for "normal" burden rates. The detail shown, which of course is the same for the current burden and the normal burden, is merely illustrative, and may be shifted from one burden classification to another, according to the conditions prevailing in each individual plant.

The Situation in Summary

To sum up: The problem before the foundry industry is to convert some 70 per cent of its members to the use of dependable cost methods. In the writer's opinion this will best be accomplished by hammering away at correct fundamentals, supplemented, perhaps, by skeleton layouts, in the simplest possible form, of correct fundamentals for the various types of foundries. Approaching the matter along these lines, the writer believes, is the surest and quickest way to overcome the foundryman's fear of red tape, which is largely responsible for his coolness toward the subject. The writer's opinion is that at least three associations identified with the industry either have already reached or are arriving at the same conclusion, and consequently there is hope for the future.

Common sense, freedom from technical theories, a realization that a cost system, or any other part of the scheme of organization, is simply a means to a practical end, on the part of both the exponents of uniform foundry costs and the men who install systems, are all very essential.

A Peaceful Year in Industrial Relations

Full Employment, with Peak Production, and Yet No Labor Scarcity—More Employee Stockholders—The Five-Day Week

BY CHARLES M. MILLS*

UNPRECEDENTED prosperity in American trade and commerce in 1926 has been reflected in the field of industrial relations by stable employment, high wages and relatively few serious labor disturbances. Outstanding features were the adequacy of labor supply at the time of peak production; the promotion of international labor relations through the visits of leading foreign industrialists and labor missions; the abolition of the United States Railway Labor Board; the phenomenal growth of labor banks and employee stock ownership; the announcement of the Ford five-day week; and the attack by the American Federation of Labor upon employee representation plans.

High Production with No Labor Scarcity

The Federal Reserve Bank estimates that the total volume of production and trade in 1926 was 5 per cent greater than in 1925 and 35 per cent greater than in 1919. This peak production was accomplished in most industries with the same amount of labor, although labor shortage might have been expected, particularly in view of the restrictive features of the new immigration law. Yet there has been neither labor shortage nor unemployment; labor supply and demand, with the exception of the textile and bituminous coal industries, has been almost evenly balanced. This condition has been due chiefly to vastly improved mechanical efficiency and administration, and to the increase in the spirit of cooperation and in general morale on the part of labor.

This situation has done much to convince American industrialists as well as the general public that the restrictive features of the immigration law should be retained. The evidence of the past year has almost silenced the opponents of the new law who only a couple of years ago, prior to the passage of the act, predicted extensive labor shortage and fantastic wage levels in times of prosperity. The new law has proved not only socially justifiable but economically sound.

International Labor Relations

Although we have closed the doors to wholesale European immigration, we have welcomed many foreign visitors to our shores who have come to seek "the secret of high wages." There have been visits from important labor missions, labor leaders, and industrialists from many countries during the year. The report of the delegation of the British trade unionists financed by the London *Daily Mail* created a stir throughout England. Perhaps the comments were altogether too complimentary to American industry, based too much on a "blue line tour" of our more progressive factories and shops and not enough upon a review of our more typical conditions. It is to be hoped that the reports of the British Labor Mission under Sir William McKenzie and of H. B. Butler (deputy general of the International Labor Office), with its comprehensiveness of itinerary and methods, will be of a somewhat more critical nature and therefore of greater value to the institutions they represent and to their American hosts.

Our foreign visitors agree upon one essential—the outstanding comradery between management and men in American industry. Perhaps this observation may serve to portray the typical American as less of a Shylock than now envisioned by the average European. In any event, there is no doubt that such international

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contacts have a widespread influence and may go far in counteracting our unenviable position in European affairs at the present time.

Foreign events of 1926 which have had much attention throughout American industry were the general strike in England; the Mussolini acts in Italy covering trade and collective agreements, industrial courts, strikes and lockouts; the effort of Russia to obtain official recognition by the United States (with the continued refusal by the American Federation of Labor to send a labor mission to study the situation); and the agitation over the laws in Mexico (effective at the beginning of 1927) involving many American industrial enterprises.

Labor Disturbances

Aside from strikes in the woolen and worsted mills in New Jersey, the clothing and needle trades in New York and in the anthracite coal industry, the year was remarkably free from serious labor disturbances. The New Jersey strike has lasted practically the entire year. Leadership passed from radicals to representatives of the American Federation of Labor. Recently agreements on more or less of a status quo basis were effected with two of the most important mills. The strike affecting certain parts of the International Ladies Garment Workers' Union in New York has just been settled by arbitration after a long struggle between the so-called "communist" and conservative labor factions.

The anthracite strike, after 169 days of suspended production, was settled on practically a status quo basis. A five-year term of agreement laid employees on conciliation and arbitration within the industry. In the bituminous industry, the boom caused by foreign demands during the British coal strike resulted in some operators increasing wages from the 1917 scale to the Jacksonville scale, though there has been revision downward by some companies in the past few weeks. Indications point to a bituminous coal strike in April, 1927, at the time of the expiration of the Jacksonville agreement made in 1923. Efforts will undoubtedly be made by union operators to reduce wages to the 1917 scale, generally used by non-union operators, while the United Mine Workers may be expected to hold for the Jacksonville scale, using as an argument the increases noted above which were made during 1926.

Abolition of Railway Labor Board

The past year witnessed the abolition of the United States Railway Labor Board and the passage by Congress of the Watson-Parker act, introducing a new type of legislation. The uniqueness of the new law is not that mediation and arbitration are established by law but rather that the bill was an agreed measure formulated by the carriers and the brotherhoods. Thus, in reality Congress sanctioned a collective agreement of national and basic importance. The law was the result of voluntary agreement and in no way favors compulsory service or compulsory arbitration.

The first decision made by the Board of Arbitration, effective Dec. 1, awarded 89,000 conductors and trainmen on Eastern railroads a 7.5 per cent increase in wages amounting to approximately $15,000,000 per year. The brotherhoods asked for a 19 per cent increase. The vote of the board was 4 to 2, the public representatives voting with the brotherhood members. Other important questions relative to wage increases are now before various boards of adjustment.

Financial Development of Labor Organizations

Continued growth of labor banks and the extension of labor organizations in various other investment and financial enterprises were features of the year. The *Commercial and Financial Chronicle* reported in the middle of the year that there were 38 labor banks in existence, with a total capital of over $10,000,000, total deposits of $108,000,000 and total resources of over $127,000,000. A Philadelphia labor bank and a labor trust company in Atlanta were reported as having failed. The Brotherhood of Locomotive Engineers spent $2,500,000 in Florida real estate development, while the newly organized Union Life Insurance Co. of Washington wrote policies covering a large part, if not the whole, of the $600,000 which was set as a goal at the beginning of the year.

Employee Stock Ownership

Stock purchase by employees had a phenomenal growth in 1926. The New York Trust Co. reported that 315,497 employees in 22 leading corporations owned $454,963,282 worth of stock in the companies employing them, while the Industrial Relations Section of the Department of Economics and Social Institutions of Princeton University in a recent book on the subject estimated the total stock holdings of employees at more than $700,000,000. In three of the largest Standard Oil companies the year marked the expiration of the five-year period of stock purchase plans, and more than $90,000,000 worth of stock was distributed to 44,000 employees. These companies immediately authorized new stock purchase plans, practically identical with those which had expired, except that a three-year instead of a five-year period was provided.

Insurance and Other Industrial Relations Features

Group life insurance has continued as an important industrial relations policy in many leading corporations. Last year the General Motors Corporation offered group life insurance to all employees on a cooperative basis, and more than 97 per cent of the employees accepted the opportunity. The United States Rubber Co. adopted the plan for salaried employees and the General Electric Co. established a salary allotment insurance plan supplementary to the group insurance already in force. The Bethlehem Steel Co. adopted death benefits ranging from $500 to $1,500 and sickness benefits ranging from $10 to $12 per week, the employee contributing from $1 to $2 per month. It is estimated that $3,500,000,000 worth of group life insurance is in effect in the United States covering more than 2,500,000 employees.

The Baltimore and Ohio Railroad increased the rate of its pensions 50 per cent, adding annual costs of $232,000, and placing the total yearly cost at $700,000. Since 1884, the company has paid out more than $6,000,000 in pension relief to 3700 old employees.

Vacations with pay were granted to wage earners in some companies for the first time in 1926. In addition, the service requirement for vacations was materially reduced in several large corporations such as the Standard Oil Co. of New Jersey, the Tidewater Oil Co., and the Western Electric Co., largely because vacations granted to older service men had proved not only socially expedient but good business. On the basis of such evidence, the vacation movement shows every indication of expansion in American industry.

Public and industrial relations policies and programs were adopted for the first time in several important corporations, apparently in realization of the economic value of definite formulation and procedure. The technique of industrial relations administration was thereby placed on an even firmer foundation, particularly as regards the development of budget control in relation to the distribution of personnel and wage and salary adjustments.

The Five-Day Week Not New

One of the outstanding features in the field of industrial relations during the year was the announce-

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DIRECTORS OF THE AMERICAN IRON AND STEEL INSTITUTE

at the Regular Monthly Meeting in New York, December 17, 1926

FRONT row, left to right: WILLIAM J. FILBERT, comptroller United States Steel Corporation, New York, and treasurer of institute; WILLIS L. KING, vice-president Jones & Laughlin Steel Corporation, Pittsburgh, and vice-president of institute; ELBERT H. GARY, chairman United States Steel Corporation, New York, and president of institute; JOHN A. TOPPING, chairman Republic Iron & Steel Co., New York, and vice-president of institute; E. A. S. CLARKE, secretary of the institute, New York.

SECOND row, left to right: JAMES A. FARRELL, president United States Steel Corporation, New York; EUGENE G. GRACE, president Bethlehem Steel Corporation, Bethlehem, Pa.; ISAAC M. SCOTT, president Wheeling Steel Corporation, Wheeling, W. Va.; JAMES A. BURDEN, president Burden Iron Co., New York; SAMUEL MATHER, Pickands, Mather & Co., Cleveland; JAMES A. CAMPBELL, president Youngstown Sheet & Tube Co., Youngstown.

THIRD row, left to right: S. E. HACKETT, vice-president Jones & Laughlin Steel Corporation, Pittsburgh; HORACE S. WILKINSON, chairman Crucible Steel Co. of America, New York; SEVERN P. KER, president Sharon Steel Hoop Co., Sharon, Pa.; WILLIAM H. DONNER, president Donner Steel Co., Buffalo; LEOPOLD E. BLOCK, chairman Inland Steel Co., Chicago; ALVA C. DINKEY, president Midvale Co., Philadelphia.

ment of Henry Ford that he would place his factories on a five-day week of 40 hours with no reduction in wage rates. The statement caused widespread comment. Shortly afterward the American Federation of Labor in its annual convention went on record as advocating the five-day week for general adoption in American industry, and in comment President Green said:

> The workers are convinced that the shorter week is practical, economically sound and necessary to the further social and spiritual progress of the great masses of the people.

As a matter of fact, a shortened work week of five days (sometimes amounting to 40 hr.) is not a novelty in American industry. For a considerable period a 40-hour week has been a fixture in certain agreements in the clothing and needle trades. The Dressmakers' Department of the International Ladies Garment Workers' Union in New York has had such an agreement since May, 1923, while this year a new agreement made by the Cloth, Hat, Cap and Millinery Workers' Union in New York and lasting until June 30, 1929, stipulates a 44-hour week to July 1, 1927, and a 40-hour week (five days) thereafter. The recent agreement made by the inside manufacturers and the International Ladies Garment Workers' Union states that a 42-hour week (8½ hr. for four days, 8 hr. fifth day) is to be worked until June, 1928, and a 40-hour week thereafter. As a result the union's demand for a yearly minimum time guarantee was dropped, since the union felt that under the shorter week work will probably increase from 26 to 32 weeks to 35 or 36 weeks—a standard which they have constantly fought for in many years.

In these cases, however, the shorter week has been effected through certain peculiar circumstances, as the result of (1) pressure by labor unions and (2) as a means of extending employment during the year in industries largely seasonal.

Not Always a Measure of Operating Efficiency

The preceding analysis shows that in discussing the five-day week care must be taken to appraise the motives that underlie its adoption. The five-day week (and even shorter week) has frequently been adopted temporarily and occasionally permanently by management at time of depression or decline. It may be a concentration of the same number of hours formerly worked during a six-day week; it may be adopted as a concession to labor, with an increase in rates, but with no guaranteed increase in production; or adopted with an increase in rates on the basis of larger production. In other words, the five-day week is not always adopted as a measure of operating efficiency. Political, social or general economic factors may be involved.

The only sane approach to a consideration of the shortened week lies primarily in its practical and economic application to the particular plant or industry involved. If the labor supply, mechanical equipment, capital investment and a score of other factors in the individual factory, company or industry can be adjusted so that increased production and efficiency will result from the shorter period, then and then only can the shorter week be adopted advantageously. Upon such premises, Mr. Ford announced his policy. To agitate for a shorter period upon moral and social grounds rather than the economic factors involved may invite disaster to our industrial fabric.

It is but a short time ago that the principle of the six-day week and the eight-hour day began to be accepted by public opinion. There are still large areas in American industry where these policies have not yet been accepted. To foist upon industry a policy for a widespread application of the five-day week at the present time may block the gradual movement toward the comparatively conservative shorter week of 48 hours.

Employee Representation

The National Industrial Conference Board recently reported that in 1926 there were 431 companies with 1,347,000 employees who had adopted representation plans, as compared with 421 companies and 1,177,000 employees in 1924. The statement indicates steady growth in this method of promoting internal relationships in industry.

For a number of years the American Federation of Labor has adopted resolutions against employee representation, but in a more or less perfunctory fashion. The annual convention in 1926, however, went considerably further. Fiery speeches were made by officers against these "compulsory and autocratic methods of enslaving the worker against his will." A special assessment was ordered upon affiliated organizations to create a fund "with which to carry out the study and campaign designed to remove these employer-controlled unions and shop representative plans out of our industrial life."

Companies which have established these plans may therefore expect propaganda of the nature mentioned above during the ensuing year. Representation plans have been created in many industries where there is no other means of employer-employee contact. Mc[illegible] of these relationships have promoted understandin[illegible] and fair dealings, and therein is to be found the best defense against attacks designated to break down mutual confidence.

Conclusion

In the main, the year has been one of progress and substantial growth in the betterment of human relationships in industry. We are now in the midst of a period of vast prosperity, with large dividends, high wages, huge production, continuous employment.

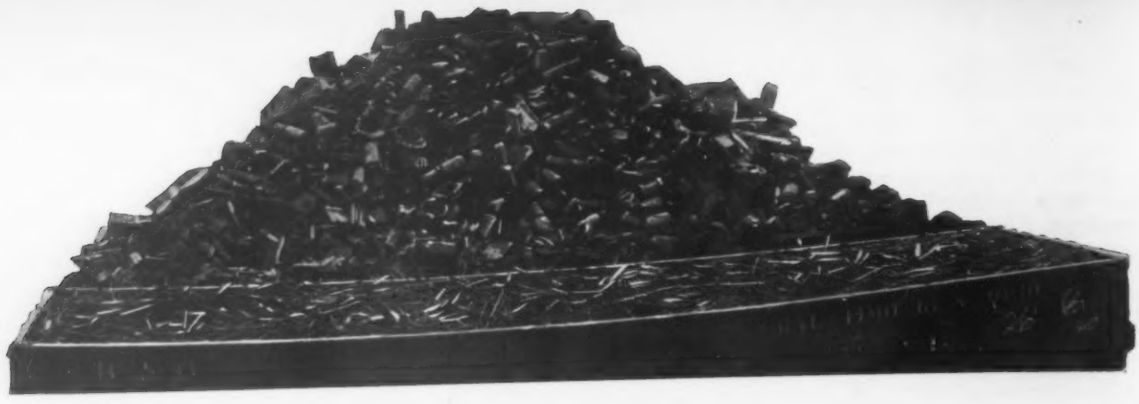
Such an era is not a time for mere self-congratulation, but is a strategic opportunity for self-examination and for promotion of such human relations in industry as will stand the severest tests of adversity. Through budget control, reduction of inventories, and buying for consumption only, we have made long strides for the permanent elimination of seasonal peaks and valleys; for the eradication of methods that lead to inflation, overproduction, and ultimate depression.

However, can we make breadlines impossible? Can we banish misunderstandings so as to prevent the recurrence of Herrin disasters? Can we still furnish confidence and faith between management and men? In the earnest attempt to solve such questions lies the real measure not only of economic but spiritual growth in American industry.

Fewer Iron and Steel Workers

November employment in iron and steel plants is reported as lower than in October, in figures of the United States Bureau of Labor Statistics. Data from 213 establishments show a reduction of 1.1 per cent from the 288,207 on the payroll in October to 285,173 in November. The reduction in the average pay envelope was about 2.3 per cent.

Returns from 989 foundries and machine shops showed a similar but somewhat accentuated condition. The reduction of employees from 250,148 to 243,560 was 2.6 per cent, while the reduction in the payroll from $7,516,932 to $7,225,212 was 3.9 per cent. Machine tools on the other hand, showed a slight gain in 160 plants, from 31,969 employees to 32,117, and from a weekly payroll of $994,607 to $1,002,444.



Changing Trends in Scrap Trade

Supply Increasing, Producers Selling More Frequently to Consumer, More Careful Preparation Demanded— Railroads Accumulate 5,000,000 Tons a Year

WITHIN the past few years gradual changes have come in the production, marketing and consumption of iron and steel scrap. Some of these changes are now sufficiently marked to merit the attention of producers, traders and consumers in that they probably indicate new trends which will be more apparent as time goes on. Briefly, these trends are:

1. An increase in the supply, thereby eliminating the shortages which have come at periodic intervals in the past with resultant sharp rises in prices.

2. A slow but steady development of contractual relations between producers and consumers, whereby scrap is shipped direct to the user without the services of a middleman or broker.

3. Changes in grading of scrap and in mill practices with the result that some grades formerly in demand for one purpose are now being diverted to other purposes; the utilization by steel plants of lower grades of material that were hitherto considered unsuitable for use.

4. High freight rates have had a considerable effect in changing channels of scrap movements from producer to the consumer. Water shipments from the Pacific Coast to the Atlantic Coast and from Duluth to Buffalo on the Great Lakes have been among the developments along this line.

5. Narrower price fluctuations have given the smaller yard dealer in scrap less opportunity for speculative profit, and the result has been the elimination of some dealers and the closing down of numerous scrap yards, with signs pointing to the eventual concentration of scrap business in more efficient hands.

6. The probability that the larger consumers of scrap will demand more careful preparation and selection by yards or producers in an effort to bring about lower handling and operating costs in the open-hearth plant and blast furnace, thereby putting scrap more nearly on the basis of a manufactured commodity than at present.

Railroads and automobile manufacturers are conspicuously the largest producers of scrap and their offerings during the past year have shown a notable increase. In the case of the railroads this has been in part due, of course, to their extensive rebuilding programs and their careful watchfulness of the scrap item, one of no mean importance when it is realized that with some of the larger roads such revenue runs into the millions of dollars annually. The tremendous output of automobiles in itself explains the growth of scrap shipments from that source, and a few of the larger producers may count such revenue equal to the retail price of 10,000 to 20,000 cars.

No estimate of the output of scrap by the railroads and automobile makers has ever been attempted, but THE IRON AGE has completed a survey which gives a representative picture of the extent to which these two large consuming groups turn back to steel and pig iron furnaces their waste products to be re-melted into steel.

Railroads Produce About 5,000,000 Tons a Year

This survey shows that 44 railroads having a total of 125,835 miles of the total track mileage of the country (the total being 250,568 miles) in 1926 produced and sold 2,742,194 gross tons of all grades of iron and steel scrap. An estimate for the entire country, taking as a unit the tons of scrap produced per mile of road by the carriers reporting, is certainly not less than 5,000,000 tons, and possibly would run over that figure.

No reliable estimate is possible as to the total amount of scrap consumed by all of the metal-working industries, including blast furnaces, foundries, iron rolling mills and electric furnaces as well as open-hearth plants, but the figure probably runs close to 20,000,000 tons. Of this a considerable proportion is scrap produced by steel companies themselves and re-melted in their own furnaces. The amount that enters into trade is probably somewhere between 12,000,000 and 15,000,000 tons a year, depending, of course, on the extent to which industry is operating.

On this basis the railroads of the country produce at least one-third or more of the scrap that is sold in the open market. In the case of the railroads a good deal of scrap is also produced through the purchases they make of cars, locomotives and other equipment.

Not all of the railroads reporting their scrap sales to THE IRON AGE gave detailed figures as to the various grades accumulated, but 15 large roads whose total sales amounted to 1,764,752 tons divided their scrap into the grades shown in the accompanying table. It

will be noted that heavy melting steel, rerolling rails and old carwheels form the largest items.

Automobile Scrap Production Largely Borings and Turnings

On the basis of the reports sent to THE IRON AGE the scrap produced in the manufacture of passenger cars and motor trucks is 533 lb. per vehicle, although of course this figure varies with the weight and type of car.

Automobile manufacturers making 83.6 per cent of all of the cars and trucks produced in the United States in 1926, exclusive of the Ford Motor Co., which sells little or no scrap, last year accumulated approximately 570,887 gross tons of ferrous scrap. Applying this ratio to all of the car and truck makers outside of the Ford organization, the total for the industry was 682,880 gross tons. Ford's production is not sold in open market, but is used in the Ford blast furnaces, open-hearth and electric furnaces, and at times the Ford Motor Co. has been a buyer of scrap, its purchase of steel ships from the United States Government being the most conspicuous instance. If the Ford scrap production were to be included the total for the entire automobile industry would probably be around 1,000,000 tons a year. This does not include all of the scrap that motor manufacturing throws on the market as it does not cover the many parts and accessory manufacturers. One large steel body plant in the East, for example, markets about 12,000 tons of compressed sheet scrap a year.

Seven large and representative automobile manufacturing companies whose combined scrap accumulations in 1926 approximated 515,000 gross tons produced borings and turnings amounting to more than half of the total of all grades. Borings and turnings for the seven companies aggregated about 275,000 tons, compressed sheet scrap was about 90,000 tons, heavy melting steel about 24,000 tons, machinery and automobile cast about 12,500 tons, and the remainder, upward of 100,000 tons, was made up of miscellaneous grades.

Scrapping of Old Automobiles

A growing source of scrap is the discarded automobile. It is estimated that about a million cars find their way each year into automobile graveyards, where they are broken up. The quantity and quality of the scrap in a car depends largely upon the make and the year in which it was manufactured. Most of the wrecked cars produce iron and steel, aluminum, brass, copper, babbitt metal, rubber and hair. The average recovery of iron and steel from a high-grade, heavy car will range from 1400 to 2300 lb. The chassis are cut up for heavy-melting steel. The fenders are cut into small pieces for blast furnace use. However, the chief profit in the wrecking of old cars is said to come largely from the sale of second-hand parts and accessories.

A commodity that is rather recent on the scrap horizon is automobile truck tires with rubber attacked. These are steel rims with heavy rubber tires cemented on them, and for a while they were a distinct problem as to the best methods of marketing. This difficulty, however, has been overcome, machinery having been designed to pull this rubber off, at the same time cleaning the steel of the cement, and the actual steel rim, when properly prepared, makes good scrap. The old rubber is also utilized in the scrap rubber trade.

Railroads Closely Studying Scrap Demands

Railroads appear to have made a very close study of the demand for scrap as is shown by the methods they employ to adapt their classifications so as to obtain the highest possible market returns. They are paying less attention to the assortment of miscellaneous road scrap, this grade frequently going to dealers as miscellaneous scrap without having gone through a classification yard.

One of the items which formerly loomed large on railroad lists was wrought scrap, which was for many years in demand by iron rolling mills. In some districts the market for such scrap has completely disappeared, while in others it is of minor importance. The reason for this is that some companies have discontinued the manufacture of iron bars while others are using mechanical methods of puddling in which other grades of old material are utilized. Thus it is that such items as long and short railroad wrought, long and short yard wrought and soft steel pipes and tubes are more and more being shipped as heavy melting steel not only by the dealers but by railroads as well.

Producers Dealing Directly With Consumers

Although there are many small producers of scrap whose accumulations never reach a sufficient amount to warrant direct dealing with the consumer, the tendency among many of the larger scrap producers is to eliminate the broker or dealer and ship direct to the steel mill or other consumer on yearly contracts, prices being adjusted monthly, frequently on the basis of trade journal quotations. Some of the larger steel companies have encouraged their steel customers to make such contracts, thereby insuring a steady flow of scrap obtained from the steel that goes from their mills. Consumers are more frequently bidding for scrap on railroad lists in competition with dealers and brokers.

Producers have in many instances equipped their plants to prepare and separate the various grades of

Grades of Iron and Steel Scrap Chiefly Accumulated by the Railroads

Road	Heavy Melting Steel	Low Phos. Melting Grades	Malleable Scrap	Cast Iron Scrap	Rerolling Rails	Carwheels (Iron)	Carwheels (Rolled Steel)	All Other	Total
1.....	3,352	....	862	3,482	12,169	14,856	393	19,803	54,917
2.....	4,400	....	1,200	1,000	1,500	15,000	1,000	37,000	61,100
3.....	2,218	....	1,343	1,673	16,886	22,007	1,581	88,882	134,590
4.....	18,000	600	1,800	5,400	12,000	*	*	*32,200	70,000
5.....	9,575	1,603	1,646	2,162	....	22,332	523	13,391	51,222
6.....	45,549	5,320	2,000	7,080	20,000	17,500	1,112	3,200	101,761
7.....	15,500	....	3,200	5,000	2,000	50,000	1,500	120,000	197,200
8.....	125,474	10,500	4,000	13,850	80,455	69,144	3,100	45,942	352,465
9.....	20,455	1,983	1,656	3,555	14,675	19,662	721	8,645	71,352
10.....	15,000	3,300	2,100	2,400	25,000	28,000	1,000	21,000	97,800
11.....	949	....	2,414	5,009	18,617	20,682	1,417	77,634	126,723
12.....	6,418	3,801	2,822	5,099	14,206	30,687	....	62,196	125,229
13.....	18,522	....	4,482	3,644	12,300	3,480	650	54,753	97,831
14.....	....	....	1,500	2,500	40,000	24,000	3,000	33,000	105,000
15.....	6,859	....	4,020	5,716	15,564	26,493	996	57,904	117,552
Total..	292,271	27,107	35,045	68,570	285,372	363,844	16,993	675,550	1,764,752

*Carwheels, both iron and rolled steel included in All Other.

scrap in a way to bring the maximum market value. A Detroit automobile company, for example, is making cast iron borings into briquettes and using them in place of a like amount of pig iron in its cupolas. An Ohio steel plant is making borings and turnings into briquettes for use in an electric furnace. There is more of a tendency among large producers to cut up long machine shop turnings into short shoveling turnings for use in blast furnaces. One of the advantages of cutting up turnings is that more can be loaded on a car, storage space is conserved and the higher market values pay for the cost of the effort. Nearly all of the larger metal stamping companies now have baling presses for pressing light sheet scrap into bundles, enabling them to get a price only slightly under the prices paid for heavy melting steel.

As contract relations between users and producers of scrap grow in number it seems likely that further methods will be developed for the economic utilization in the steel plant or blast furnace of grades not now given special preparation. It perhaps should be added that many producers of scrap have given definite indication that they prefer not to deal directly with the consumer, believing, as they do, that it is the scrap broker and dealer who make the competitive markets which result in higher prices for their output.

Changes in Grading and Mill Practice

Formerly many of the steel plants insisted on having the best grades of heavy melting steel for their open-hearth furnaces. Now they are getting away from the idea that they must use the best material and are in many instances using cheaper scrap to reduce their costs. This demand from the mills has resulted in the adoption of two classifications for heavy melting steel, No. 1 and No. 2 grades, although such classifications have not yet been followed in all districts. The No. 2 grade is lighter material and usually sells at 50c. or $1 a ton below the price of No. 1 steel scrap. Considerable material now classed as No. 2 previously went to mills not so exacting in their specifications as others. In line with the tendency to use cheaper scrap more machine shop turnings, busheling, compressed sheet steel, stove plate and grate bars and heavy breakable cast scrap are being used in open-hearth furnaces.

No. 2 heaving melting steel scrap as now produced includes among other things country scrap that previously was cut up into short shoveling scrap. Scrap from the chassis of old automobiles also figures more and more largely in this classification. Scrap produced by the automobile graveyards has become quite an important item. The chassis are cut up by torches in open-hearth charging box sizes. The old bodies go into No. 2 busheling. Old tire rims go as No. 2 heavy melting steel.

The automobile has brought about a greatly increased production of turnings, so much so that some of the steel mills have got into the habit of using them as a major portion of their charge. The automobile has also brought a serious problem in the scrap industry, that of alloys. This is true not only of the worn-out automobiles that are prepared for scrap, but also of the scrap which comes on the market as a by-product of manufacturing, such as turnings, drop forge trimmings, steel scrap and skeleton steel.

High Freight Rates Alter Distribution

Water shipments of scrap have increased since 1920, when the present schedule of freight rates on railroads went into effect, and this tendency has been particularly noticeable in the past year. The Bethlehem Steel Co. last summer brought about 50,000 tons of steel from Detroit to its Buffalo plant by water and about 25,000 tons from Duluth. Shipments of scrap from Seattle, Wash., and other Pacific Coast points, from Texas and Cuba have been fairly frequent to the Sparrows Point plant of the Bethlehem Steel Co. near Baltimore. The ocean freight rate from Seattle to Sparrows Point on scrap is $4.25 per gross ton; hence it becomes profitable to bring scrap from the West coast whenever prices in the East reach a high point.

Chicago produces more scrap than the mills of that district consume, and lately an investigation has been made by scrap dealers in that city looking toward the movement of scrap by water from that point to Cleveland and Buffalo. One dock company in Chicago probably will have equipment installed this year that will make such shipments possible.

High rail rates have had the effect of restricting distribution. For example, although the Chicago district produces more scrap than it consumes the fact that it costs $5.42 to move scrap to the Pittsburgh district and $4.54 to Cleveland makes it difficult to meet the competition of shippers in Detroit and elsewhere who have lower freight rates to the Pittsburgh and Cleveland mills.

New Economic Factors in Scrap Trading

Fortunes have been made in iron and steel scrap because of fairly wide swings in prices, but the situation has changed in the past year or two. Margins of profits have been smaller, due to narrower price swings, and no doubt the larger consumers have profited by lessons of the past and have improved their buying methods.

It was the custom for many years of the scrap trade to accumulate scrap during periods of low prices, holding it until the mills, forced by real or manufactured shortages, came into the market and bid prices up to a point that brought large profits for those dealers who had the foresight and capital to put away good-sized stocks. In the active period of 1919-20 there was a swing of prices from $14.52 in March, 1919, to $26 in February, 1920, these being the monthly average of quotations at Pittsburgh, Chicago and Philadelphia, as shown by THE IRON AGE. In the past year there has been a difference of only $2.62 between the high and low points. The high average was in January, 1926, it being $16.97, and the low average was $14.35 in May, 1926.

The life-blood of the scrap trade has been speculative profit, but it is apparent that a new era is dawning, and that scrap business will be done on a more efficient basis, with margins of profit based on better methods of cost accounting rather than on mere speculation. Many dealers have gone out of business in the past year; some yards have been shut down because of lack of profits.

From the scrap man's viewpoint one of the greatest evils of the business is the reckless bidding up of prices by irresponsible dealers or those poorly informed as to their costs, and thus a whole market has been affected to the detriment of those who try to do business on an efficient basis. In the opinion of some in the trade this situation will work its own cure in that the inefficient are already being weeded out through the losses they have sustained.

Scrap to Be More Carefully Prepared

Many of the larger and more experienced dealers and also some of the larger consumers take the view that the next few years will bring about marked changes in the gathering, preparation and consumption of scrap. There are unmistakable evidences of a larger supply each year. The growth of manufacturing of articles of steel in itself assures a steadily increasing supply of scrap. Reference need be made only to the quantity that is now coming on the market from the

(*Concluded on page* 41)

Machine Tool Industry Advances

Of Post-War Years 1926 Led in Production, but the Price Problem Persists—More Call for Special Machines—Europe Buys Less—Factors in the 1927 Prospect

BY COL. FRANK A. SCOTT*

NINETEEN-TWENTY-SIX in the machine tool industry has been a good year as to volume. Total production will be larger than that of any year since the war. This is the best part of the story. All the rest is less encouraging. While the price trend has been upward, upward also has been the trend of costs of material, labor, sales, overhead, and taxes. Price increases have not yet overtaken mounting costs. Therefore, the profits of machine tool manufacturers again are disappointing.

Such a condition in any old and highly developed industry provokes a question and really justifies a challenge. Can the industry show that it is being well handled; that it is availing itself of all the economies possible in modern manufacturing; that its selling methods are economical; that its trade is being educated to bear a proper proportion of experimental and development work? The disappointing results of the year 1926 will assure the painstaking review of at least all these problems by every American machine tool executive. In this industry as, most conspicuously, in that of its largest customer, the automotive industry, there has been and continues to be a relentless march toward eliminating the weak and the slow.

The final judgment will be that the cost of new designs, increased experimentation, the patterns, jigs, fixtures, and special tools to produce such new designs, has mounted more rapidly than could be offset by any obtainable increase in the price of the product.

Demand Came from Many Sources

THE buying movement in machine tools during 1926 was especially broad, covering practically every section of our country, and most of the civilized world. It was largest in those great industries which were not new, nor involved in large expansion programs, but which were merely changing their designs, or improving production methods. Here again the American automotive industry was the leader.

Replacement of obsolete equipment played a large part in the year's business. Retooling of existing equipments, based on surveys by equipment engineers to determine possible improvements, was also a considerable element. This augmented the small tool business in all lines. The old tradition among metal workers, that small tools could be produced better and more cheaply in their own tool rooms, has been wrecked by impact with solid facts. It cannot be concealed from the active minds in the metal industries that no metal workers now or at any time anywhere have been so well served by equipment makers as our American group.

Preeminence in Mechanical Power

PER capita consumption of power in our country is the greatest in the world. It is the best evidence that the man power of the United States is not wasted in needless toil, but that machinery to an increasing degree takes the load of drudgery off the worker. This ability to utilize mechanical power rests absolutely on two things: our national mechanical equipment and our possession of a machine tool industry capable of designing and manufacturing such equipment.

It is impossible to disregard the influence on the economic life of our country of this steady progress in manufacturing methods. It would be difficult to overstress also the significance of this statement:

During the year 1926 *the United States produced a steel and iron tonnage equal to that of*

*President, the Warner & Swasey Co., Cleveland, Ohio.

COLONEL SCOTT'S appraisals of conditions and prospects in the metal-working industries have been a noteworthy feature of our annual reviews in recent years, and the present article, our readers will agree, quite meets the expectations created by its predecessors. In respect to volume, 1926 *was the best of the post-war years for the machine tool industry, and Colonel Scott credits it with a marked advance in the productivity and accuracy of machine tools.*

But there are problems. Price increases, the article points out, "have not yet overtaken mounting costs," and in the second paragraph questions are raised which are having the best thought of leaders in the industry. No portion of Colonel Scott's review will have more appreciative reading than that dealing with the tendency among large buyers to demand special features in machines heretofore produced as standard. The machine tool manufacturer, while unable to reduce cost by quantity production, is thus asked to furnish machines of greater productive capacity at prices heretofore paid for the standardized type.

the rest of the world, and reduced this to articles of human need or convenience by the most economical methods ever known to man.

One-sixth of the world's population is producing over 50 per cent of its steel, and enjoying the use or profit arising therefrom. The reaction on our standard of living must be and is immediate and incalculable. On the rest of the world the reaction, while less immediate, is vast and will develop many problems.

This condition arises not alone from our possession of certain resources of iron ore, coal, etc., but from something inherent in the American character which through a century has been reflected in our industrial progress. It is a disposition to develop something new and then use it. The cotton gin and agricultural machinery were early manifestations and electrical products and automobiles more recent ones.

Advances in Design and Tooling

DURING the years since the war, and especially during 1926, there has occurred the greatest advance ever made within a similar period in the productivity and accuracy of machine tools. The introduction of specialized automatic and standard automatic machines of improved type has been a large part of this program. Semi-automatic and hand machines have appeared in altered designs which reduce production cost and require less experience in the operator.

The science of tooling these new engines of production has also been notably advanced. Moreover, the users have shown encouraging receptivity, and the substitution of new machines and tools for old ones, even while the used equipment retained years of serviceability, has been impressive. The results are reflected in the balance sheets for 1926 of many of our great American industries.

Better Returns a Desideratum

IT must be acknowledged that temporarily this splendid effort of the machine tool manufacturers toward the improvement of American methods of production has not resulted in adequate profit for the machine tool industry; but this condition will be changed when time enough has elapsed to educate the users.

American manufacturers are astute enough to see that there is nothing to be gained and much to be lost by a policy of niggardliness toward this astoundingly helpful element of our national industrial life. The manufacture of machine tools is one of the few fundamental industries of our country. On it are based the development and prosperity of all our metal working industries, indeed, of most of our industrial fabric.

The response sometimes made by large users to the effort for increased prices is that the machine tool industry should standardize and thus reduce its costs. A parallel is drawn between it and the automotive industry, but one that unfortunately does not apply. One product is a consumer product, and the other a producer product, and this difference creates a line of divergence in possibilities of production and sale that is unescapable. The fact is, the hope of the American machine tool producer that he might emerge as the manufacturer of a standardized product has less to sustain it today than it has had for many years.

Specialized Products Mean Higher Costs

CONTRARY to expectation, there has been a tendency for large customers to demand specialization rather than standardization, and a disposition on the part of weak producers to attempt to supply such specialized products at the price of the standard article. Time was when the machine tool manufacturer considered the lathe, radial drill, shaper, and other machines as standard articles which could be manufactured in quantity and shipped against orders from a warehouse stock. This condition has now so changed that many machines have some special feature attached to them which increases their productive capacity for the user, but the addition of which has introduced new forms of cost to the producer. The substitution of higher grade materials in machines, such as special alloys, while greatly improving serviceability, has also added to cost in places where this is not readily recognized by the user. The user's idea of price is quite naturally formed on his experience with the standardized type.

Changes in Sales Methods

THE sales methods in the industry are also rapidly and radically changing under the pressure of new demands and increased competition among producers.

The demand for special features or equipment on machines heretofore produced as standard is introducing serious complication and added cost in selling as well as at the factory. Most standard machines can be sold with satisfactory results both to user and producer by salesmen having no special training with the machine. When special features or tools enter the discussion, not only mechanical or engineering knowledge becomes essential, but specialized knowledge—the kind that can only be accumulated through experience with the particular tool. The machine tool manufacturer must provide this knowledge. If he sells through agents, he must reinforce the agent in important cases with a specialist to supply the necessary mechanical studies and estimates. If he sells direct to the consumer, he must support a sales force specially trained to provide the mechanical knowledge necessary to insure the greatest possible reduction of cost for the customer. In either event, the consumer receives the benefit of special and expensive engineering service, frequently from several possible sources of supply, and then by comparison locates his advantage. The increased cost thus introduced into machine tool selling is one of the many elements which explain, and in the opinion of machine tool manufacturers justify, the movement for a higher price level throughout.

It would seem that there is ample evidence that the larger and more efficient machine tool producers, who after all are responsible for the bulk of the product, are handling their manufacturing and merchandising problems as efficiently as are other productive lines in our country. The disadvantages under which they have been laboring arise from the sudden swing into a new era of production. There has been a great increase in the demand for special equipments and more highly developed machines, thus destroying opportunity for quantity production of machine tools; the added movements, speeds, and feeds introduced in new machines; the use of more expensive materials; the necessity for more intensive selling methods, have added to cost. Perhaps, also, there has been a tardiness in presenting to users the reasons and need for increased prices. The depression of 1921, with the consequent disposition on the part of manufacturers not to buy new equipment unless the profits arising therefrom could be shown to amortize cost in a very brief period, has been an exceedingly important element in this situation.

Export Demand Below Expectations

EUROPEAN demand for machine tools during 1926 was a disappointment. Conveying machinery, road machinery, foundry equipment, and other lines held up better than machine tools. The explanation may rest in the general strike in England and the subsequent coal strike. The eventual effect of these disturbances on the metal-working industries of England will be helpful, but during the period of their continuance they eliminated prospects of expansion. Some types of tools

were ordered in liberal quantity for Japanese users; Russia again appeared as a buyer; but the total foreign volume was not up to expectations.

To some extent the lessening European market for machine tools reflects the growth in American exports to foreign countries of articles previously manufactured there in larger proportion than at present. The first example would be automobiles shipped by us to England and Germany. To the American machine tool manufacturer, this is merely exchanging a possible European customer for a certain American customer. The European manufacturer seems to be facing a problem with three possible solutions: (1) improving methods of production; (2) protection behind some form of governmental rampart; (3) elimination.

The horn of the dilemma most likely to be seized is improved methods of production. That solution is in line with every sound argument in the situation. The foreign manufacturer of consumer products can exploit his home market more economically and thoroughly than could an American manufacturer, and the American producer of machine tools can supply the foreign manufacturer with certain lines and types of machines unobtainable abroad. Improved financial conditions in Europe hold promise of substantial advances in foreign manufacture. The need for change is recognized; the means to make it will gradually be forthcoming.

Where Europe's Competition Is Felt

SO much for the encouraging factors in the European situation. There are some not so pleasant. The European standard of living is lower than ours; wages are lower; in some lines this means a lower cost; it means a cost so much lower that it cannot be offset by our superior manufacturing methods. Therefore, in certain items and in many foreign markets the American producer is being subjected to price competition that he cannot meet. Moreover, in many instances, this competition is on copies of his own product from European workshops. Patent protection is not always available; and although some machines, even when faithfully copied, are not so good as the original, the price differential is frequently large enough to outweigh this disadvantage.

The essential point, however, is that foreign manufacturers are certain to study the reasons underlying American industrial progress, and as one of those most readily recognized is equipment, the American machine tool industry will ultimately benefit from such inquiry.

Some Gain from Installment Buying

MARKET stimulation, with consequent increase of volume, by any metal industry helpfully affects the machine tool producer. Thus, the system of installment buying of household conveniences has been felt by the machine tool maker. Bankers and economists may differ as to the eventual benefits of this system in our general economic life, but the benefits resulting from quantity production made possible by increased volume admit of no question and are widely distributed. However, it may be that this particular form of sales stimulation has temporarily been pushed to its limit.

Outlook for 1927

THE prospect of a profitable year for the machine tool manufacturers in 1927 will not rest entirely on the volume obtainable, but almost equally on the success of the struggle to reach a higher price level. As to volume, the burden of proof will rest on those who assert that 1927 will be a bigger year in the machine tool industry than 1926. There may now be perceived evidence to sustain the contrary view.

The cotton situation in the South and the general agricultural conditions in several other areas may lessen the demand for automobiles and agricultural machinery. The building volume is more likely to shrink than to swell. The threatening labor conditions in the bituminous coal field will create anxiety.

Can these factors, beyond question unfavorable, be offset by others which seem to be equally plain and which are bound to be helpful? The railroads have been placing large equipment orders, and more are anticipated; the movement for reequipping existing plants with more efficient machinery may grow, and certainly can be developed by activity on the part of machine tool manufacturers; the buying power of the individual consumer has been largely augmented during 1926, and at a time when the sale of domestic mechanical aids is being widely developed; the increasing power of the electrical equipment sales organizations cannot be overlooked; Europe will probably be a larger buyer. If one must prophesy, 1927 looks like a good year, with scarcely a possibility that it can develop into a boom year.

Changing Trends in Scrap Trade

(*Concluded from page* 38)

breaking up of old automobiles to illustrate the point.

It is the view of many who sell and buy scrap that more careful preparation will be required by consumers. The function of the scrap yard of the future will probably be more that of a manufacturing plant than a storage place. Attention has already been called to the briquetting of cast iron borings for blast furnace use and to the cutting up of turnings to eliminate the fluffiness which is objectionable in blast furnace charging. Experiments have recently been conducted by a Cleveland steel company in cutting up heavy melting steel in small pieces, 12 x 18 in., and an eastern steel company is doing some investigating along the same line to determine whether labor costs may be cut down in putting scrap into the open-hearth charging box. When rails and other pieces are 3 ft. in length they drop from the magnet into the charging box in helter-skelter condition and a workman must straighten them out in order to make room for a maximum load in the box. The eastern mill referred to has experimented with pieces only 15 in. long and has found that hand labor at the charging box can be eliminated entirely if short pieces only are charged.

A large steel company has also made chemical analyses of cast iron borings and machine shop turnings. It has been found that frequently the cast iron borings are largely mixed with foundry sand, while emery dust has often formed a considerable part of the shipments of turnings. Consumers are more and more demanding material free from impurities. Such "doctoring" is not always intentional. In the machine shop, for example, it sometimes is difficult to keep emery dust separated from the turnings, and scrap producers confronted with this problem may be obliged to use magnetic separators if they wish to find a market for their turnings.

This watchfulness of scrap on the part of some of the larger consumers shows the drift toward greater consideration of the scrap item in the burden of the blast furnace or open-hearth furnace. It is not improbable that new specifications, or more rigid specifications, may come from such experiments as above outlined, and if such is the case scrap yards and producers will be called upon to prepare material with more exactness.

"This Prosperity" and Machine Tools

Lack of Balance with General Business Is of Vital Interest to User—Tool Prices Not in Proportion to Their Earning Power

BY ERNEST F. DUBRUL

IN our mechanized world, there are certain fundamental mechanisms that produce all the others, and our mechanized civilization depends ultimately on these for its further progress. It is well worth while to correlate facts concerning the making of these "Master Tools of Industry" with similar facts concerning general business, to learn whether this fundamental industry is keeping step with progress in every way, because failure of this industry to function properly means a slowing down of the rate of progress for all other industry.

Tools Designed Before 1920 Generally Obsolete Today

It is a fact of mechanical history, that during the last five years the machine tool builders have made very great advances in their art. Their latest designs are so far ahead of their older ones, that almost every tool designed before 1920 is definitely obsolete today. The new tools are heavier, they have much more cutting power, they are much more accurate, due to the use of more hardened and ground parts. They are fitted with more handy controls, and with more interlocks that make them more fool proof. Automatic oilers, ball and roller bearings, chain drives, direct motor drives, all go to make the tools of today much better than those of five years ago.

All these advances in construction testify to the industry's progress, ability, and good judgment, along engineering lines. It would seem needless to say that machines embodying all these late improvements in construction cost considerably more to produce than did the simpler, rough and ready types that they have displaced.

But this very progressiveness in the engineering sense constitutes one of the important commercial risks of machine tool production as a business venture. That risk lies in the obsolescence of previous designs, with all their costs of experimentation and development. No man in the industry can tell with any degree of safety how soon a given design will be made obsolete by some other inventor. This frequent and rapid obsolescence is a heavy cost that is absent from the businesses of many users of machine tools. But it is a cost that the user must pay for if a machine tool business is to be financially profitable enough to warrant its continuance.

In spite of their mechanical progress in design and construction, during the last four years of prosperity for the country as a whole, machine tool builders have often noted that by one of the ironies of the situation they were not sharing ratably in the prosperity they were helping their customers to attain, by the added productivity that machine tool men have contributed to the social well being.

The Peculiar Position of Machine Tools

Their impression is borne out by comparison of two statistical indexes. One of these generally accepted as fairly picturing the state of general business, is the index of bank debits outside of New York. Bank debits arise from the payment of obligations of all sorts. Therefore an index number derived from these debits gives some fair measure of the country's relative business activity and prosperity from year to year.

A fairly comparable index for the machine tool industry has been compiled by the writer from data of the dollar volume of machine tool orders placed with representative members of the National Machine Tool Builders' Association. To compare these two indexes fairly we have taken, as a common base, the yearly average of each index for the post-war four years, 1919 to 1922 inclusive. The first two of these years were years of boom for all industries and businesses, and the second two were years of depression and readjustment. Certainly this long period of four years should be a reasonable base for an average index. The results of these comparisons are shown in the following table, in which the 1926 indexes in both cases are given their respective proportional weights calculated on 10 months' data available at the time of writing.

Comparing Machine Tool with General Business, the Average of the 1919-1922 *Years Being* 100

Years	Bank Debits, Per Cent	Machine Tools Per Cent	Bank Debits in Per Cent of Machine Tools
1923	108	93	116
1924	111	65	171
1925	124	104	119
1926	128	113	113
Four Years Average	118	94	126

The bank debits index shows an average yearly level for the last four years, 18 per cent above the average level of the four base years, with a rising figure each year since then. Compared to this, the value of machine tool orders shows an average yearly level of 94 per cent, or 6 per cent below that of the same four base years.

The machine tool index, does not show a rise from year to year as the bank debits index shows. On the contrary, it shows a drop in 1923 of nearly as many points as the bank debits index rose in that same year. In 1924 the index of bank debits rose three points above the 1923 level while machine tool orders dropped 28 points lower than it was in 1923. Machine tool orders have a disconcerting way of behaving in exactly that peculiar fashion.

It does not require an actual slump in general business to cause machine tool orders to fall off to a quite marked extent. A mere slackening in the rate of advance in the user industries is often reflected, as in 1924, by a positive recession in the machine tool industry's activity, for reasons into which we need not enter here. This also injects an element of cost into the making of machine tools that is not present in making products whose demand is relatively more stable. That cost is the cost of idleness of peak load plants during periods of limited demand.

The year 1925 brought the machine tool industry a fair recovery, but still left its index 20 points under the bank debits index for that year. The 1926 figures show machine tool orders 15 points under bank debits. For the last four years the total bank debits index has been 26 per cent above the total machine tool index.

Comparison of these indexes gives fair grounds for the surmise that the price of machine tools has not kept pace with the added costs of the new features added to machine tools in the last four years. If the prices for these years had been in proportion to the added costs alone, the bank debits index would hardly have shown an average level as much as 26 per cent above the average level of machine tools. It is a certainty and not a mere surmise that machine tool prices have not kept pace with the increased productivity of the new tools. Had they done so the machine tool index of 1926 would have been above the level of bank debits, which were 28 per cent above the base years. There has been more than 28 per cent increase in the productivity of the 1926 machines compared to those of the base period taken.

User's Interest Lies in Healthy Tool Industry

It is not to the user's interest that the machine tool industry get into an unhealthy state. It is truly to the user's interest that the industry charge enough for tools so that it can keep itself healthy. A financially weak machine tool industry is unable to bring on the newer and better designs of machines that alone make the user's costs lower and lower. It cannot do the experimenting and research work necessary before such designs can be reduced to successful practice. It cannot support the engineering talent capable of producing the kind of machines that modern conditions demand. It cannot build the size and kind of shops, nor equip them with the kind and quantity of equipment necessary to produce the larger, more complex, more accurate tools, in the larger quantities that mass production of today requires for its own progress.

Since 1920 there has been an exceedingly heavy mortality among machine tool concerns. Unless this death rate is minimized, users may soon find too few sources of supply to which they can look for their requirements. From any sound business point of view, it is to the interest of machine tool users themselves that the builders charge enough for their product to enable their industry to grow and develop in step with the user's own needs.

Habitual underpricing of machine tools has developed a curious mental attitude in some important buyers of machine tools. This attitude is reflected in statements made by them that they expect machine tools to pay for themselves in a year, and they will not buy unless they see that much yearly profit to be gained by the tools. Of course they cannot expect any other important element of their capital investment to earn 100 per cent a year. Yet this mark is illogically set as a top price for the machine tool builder.

Cases have been known, where buyers, obsessed with the 100 per cent a year idea, have actually refused to buy machine tools that would pay for themselves in two or three years. So the stockholders of the user companies were deprived of the opportunity of having their capital invested in machine tools returning 33 or 50 per cent a year. This, too, when the company president's report proudly pointed to earnings on capital stock of 18 per cent per year, and neglected utterly to state that if the borrowed capital and surplus were also counted in, the earnings of the real capital used were about 8 or 10 per cent. It is curious reasoning that expects capital invested in machine tools to earn from 10 to 12 times the return that is boasted of as being earned by the total investment of all kinds. But this state of mind is so common that the inciting cause of it can lie only in habitual and uneconomic underpricing of machine tools by the builders.

Underpricing the Fault Builders Must Correct

The machine tool index can catch up to the bank debits index only through the operation of either or both of two causes. The first would be a material increase in the number of machine tools ordered by the buyers. The second would be an increase in the price made by the builders. But for 18 months past the buyers seem to have been ordering about as many machines as they have found necessary. And the more productive these machines are the fewer are necessary. Then, too, the country is not likely to go into a wild boom period that will make men desire to expand plants unnecessarily. Therefore there seems to be no likelihood of an early increase in the quantity factor that enters into the machine tool index.

So one may reasonably conclude that until the machine tool builders themselves ask better prices for their more costly, and more useful machines, the industry must continue to share less than it can and ought in the prosperity it is creating for others.

ERNEST F. DUBRUL writes from an experience as a manufacturer and an association executive. This in turn was built upon an education which specialized on economics. He has been general manager of the National Machine Tool Builders' Association since 1920. *For two years* (1902-4) *he was commissioner of the National Metal Trades Association. His manufacturing experience includes some twenty years as secretary, then vice-president and finally, until* 1919, *president of the Miller, DuBrul & Peters Mfg. Co., manufacturer of cigar and cigarette machines, and since* 1909 *president of the Pyro Clay Products Co., Oak Hill, Ohio. He has been notably active in business and civic affairs of Cincinnati, where he was born and where he has since resided substantially without interruption, and he is a national figure in economic, statistical, trade and engineering association meetings.*

Ferrous Metallurgy Advances

Strides Made in Heat Treatment and Metallography—Progress in Blast Furnace, Steel Making and Foundry Practice

BY HENRY M. BOYLSTON*

CONTINUED and increasing progress was made during 1926 in the development of ferrous metallurgy. Some of the features may be summarized as follows:

The use of oxygen for blowing in a blast furnace has been successfully developed and the subject of the combustibility or flammability of coke has been much discussed. Important experiments have been made to determine more closely what chemical reactions are taking place in an iron blast furnace.

Much attention has been given to the selection and testing of the proper kinds of sand for foundry molds. The cause and prevention of certain types of embrittlement in malleable cast iron have been studied.

The open-hearth conferences of the iron and steel committee of the American Institute of Mining and Metallurgical Engineers have been continued, at New York in February and at Pittsburgh in October, and a number of able papers on open-hearth practice have been published. Attention has been given to the removal of the sulphur content of coke oven gases for use in the open-hearth furnace.

Several installations of rolling mills of the Pilger type have been made which have increased the capacity of the country for the production of seamless tubing of large diameter.

The science of welding has made important forward strides.

Important results have been obtained in the field of carbon-free iron alloys and their adaptation to practical purposes. Several new types of alloy steels have been placed on the market.

Metallographic research has continued to make rapid progress and the study of the effects of cold-working and of the recrystallization of low-carbon alloys has been continued. Remarkable progress has been made in the investigation of the behavior of plain carbon steel after heat treatment, especially those adapted for the production of a combination of high tensile strength, high ductility and resistance to shock.

The present condition of the theories of the hardening of steel has been presented with clarity. The study of the dimensional changes in steel has had serious attention.

Development of metallographic technique has been extended to the use of the ultra-violet light for illumination and the development of new etching solutions for iron-chromium base alloys.

A new high-temperature thermometer, making use of metallic gallium, has been developed.

The study of the wear of plug gages has made important progress and a new machine for testing materials for fatigue has been devised. A new metallographic polishing machine has appeared on the market.

The upset process for forging small steel parts has been rapidly developed. A special study of die blocks and their heat treatment has been made.

The adaptation of electrical heating devices to heat-treating furnaces has made considerable advance.

Progress Made in Blast Furnace Practice

THE blowing in of a repaired blast furnace with oxygen is described by E. P. Ross (*Mining and Metallurgy*, June, 1926, page 253). No wood whatever was used, coke being filled in clear to the bottom. The furnace had a daily capacity of about 250 tons, about 8 tanks of oxygen were used and no difficulty was experienced. There was not an off casting made in blowing in and the furnace was up to normal in a very satisfactory length of time. After running for about one year the furnace was banked for 8 months. It was then cleaned out and made ready to blow in on the same lining. About 25 tanks of oxygen were used in this case because the lining was rather cold.

Keizo Iwase, in a Science report of Tohoku Imperial University, Series I, Vol. 15, No. 4, October, 1926, works out theoretically the equilibrium of the ternary system Fe-O-C from data already published and maintains that the mechanism of reduction of iron ores by carbon, that of occlusion of CO and CO_2 by iron and steel and that of cementation, has been satisfactorily explained by the equilibrium diagram thus derived.

T. T. Read (THE IRON AGE, July 8, 1926, page 76), discusses the meaning of the term coke "combustibility" and suggests the substitution of the word "flammability."

Reactions Which Take Place

A study of the reactions in an iron blast furnace by S. P. Kinney, P. H. Royster and T. L. Joseph (Serial No. 2747), describes the results of the investigation of this subject by metallurgists of the United States Bureau of Mines as part of a general investigation of the combustion of coke and the reduction of iron oxides in a blast furnace. After experimenting with samples taken at the Bureau of Mines experimental 5-ton blast furnace at Minneapolis, further gas samples were ob-

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tained from a 300-ton furnace making foundry iron operated by the Central Iron & Coal Co., Holt, Ala. (THE IRON AGE, July 15, 1926, page 165).

Some of the results of the investigation are:

> The oxygen of the blast has been consumed in the process of combustion at a point 27 in. above the center line of the tuyeres, and the penetration of the combustion zone in the vertical direction is equivalent to that in a horizontal direction at the tuyere level; the composition of the gas across a plane 20 ft. above the tuyere level is constant. The excess oxygen therein is due to the reduction taking place in the bosh. Analyses of samples at planes approximately 41, 53 and 63 ft. above the tuyere level show unequal gas composition across the planes due (1) to a difference in porosity in the stock column, (2) segregation of iron oxides in the outer part of the column, (3) unequal stock flow and (4) unequal gas flow.

Wallace G. Imhoff (THE IRON AGE, Sept. 2, 1926, page 612), sums up the principles governing the interpretation of blast furnace slags. He gives 15 principles which govern their interpretation and shows reasons for "off" iron and how it can be corrected.

A new blast furnace, especially designed for the purpose, has recently been placed in operation for the manufacture of ferrophosphorus (THE IRON AGE, Dec. 24, 1925, page 1731). The stack is 70 ft. in height with a 12-ft. hearth and a 16-ft. bosh, with a bosh angle of 78 deg. 41 min. 25 sec. Special precautions have been taken for preventing the escape of phosphorus during the smelting process. In the lower portion of the furnace is a special construction, differing materially from orthodox blast furnace design. The hearth jacket is of cast iron about 6 in. thick and is made up in eight sections with machined joints. The tuyere jacket is also of cast iron in eight sections, and is provided with 1¼-in. extra heavy pipe, cast integral with it. The hearth and tuyere jackets are securely held together by means of forged steel links which were shrunk on after the sections had been set.

Cast iron Shannon plates are provided for cooling the bosh, copper tuyeres, cinder notch coolers, etc. The furnace top includes a McKee revolving distributer of the latest improved type. While the furnace is not as large as many of those in existence, it is of special interest as the only blast furnace in the country where ferrophosphorus is produced.

New Light Thrown on Open-Hearth Practice

C. H. HERTY, JR. (THE IRON AGE, Sept. 2, 1926, page 610), has studied carefully the basic open-hearth process and gives data and graphs showing the rapidity and completeness of the elimination of the metalloids in an open-hearth heat. He also gives graphs showing the change in slag composition during the same heats.

A. N. Diehl, in a paper presented at the May meeting of the American Iron and Steel Institute (THE IRON AGE, Oct. 28, 1926, page 1196), discusses the action of sulphur in basic open-hearth practice. He concludes that the most assured method of producing low-sulphur basic open-hearth steel is to use materials containing a minimum quantity of that element. He points out that while gas free from sulphur is preferable, by-product or producer gas will give satisfactory results if the gas be burned so as to oxidize the hydrogen sulphide before coming in contact with the metal or scrap. Slag conditions are of primary importance and the slag should be oxidizing and basic and sufficiently fluid to effect the proper interchange between metallic and non-metallic baths.

The use of high-manganese pig iron and manganiferous ores in open-hearth practice is discussed by A. W. Smith in THE IRON AGE, Oct. 28, 1926, page 1193. It is his opinion that the advantages of the use of manganiferous pig are greater than the disadvantages. The paper was presented at the May meeting of the American Iron and Steel Institute.

How to Make Rimmed Steel

At the open-hearth furnace session of the February meeting of the A. I. M. and M. E. in New York, the subject of making rimmed steel was discussed in a paper by C. W. Peirce. He tells of the successful manufacture of this class of steel and there are discussions also by L. Reinartz, H. D. Hibbard, C. L. Kinney, Jr., W. E. Buck, and A. L. Feild (THE IRON AGE, Feb. 25, 1926, page 546).

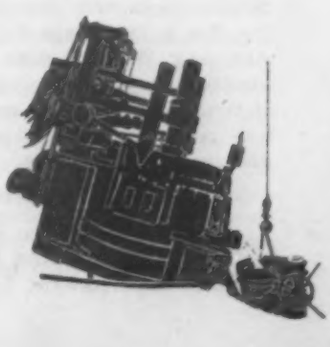
On the theory that the pressure of steel at the nozzle of the pouring ladle, due to a head of molten steel in the ladle above it, has an effect on the quality of the steel, a refractory reservoir with float has been designed to be set on the top of an ingot mold and allow the steel to flow into the mold by gravity. Gases which otherwise would become entrapped are said to be liberated and splashing with its bad effects are counteracted (THE IRON AGE, Jan. 14, 1926, page 128).

Advances in Foundry Practice Are Important

THE problem of obtaining and testing the proper kinds of sand for foundry molds has been one of the chief subjects of discussion before the American Foundrymen's Association. At the fall convention of this association many papers were discussed on the methods of testing sand and on sand control for the foundry. The important papers were as follows:

Prof. H. Ries reported progress in ascertaining and recommending the best tests for various properties of sand. W. M. Saunders reported that the committee on molding sand research has already collected and tested over 1100 samples of molding sands. He suggests the study of clay substance in sands. R. F. Harrington reported for the sub-committee on conservation and reclamation that 35 different clays have been studied and tested and considerable progress has been made on the subject of sand reclamation. A. A. Grubb stated that the sub-committee on grading has studied 727 sets of test data from all parts of the country (THE IRON AGE, Oct. 14, 1926, page 1077).

A method of desulphurizing cast iron by agitating the metal in the forehearth, by which the sulphur in the iron is said to be lowered by as much as 55 per cent, has been developed by Dr. J. Dechesne (*Stahl und Eisen*, June 30, 1926, and THE IRON AGE, Aug. 12, 1926, page 413).



Alloy Iron Castings

The Vulcan Mold & Iron Co., Latrobe, Pa., is using electrically made alloy iron containing nickel and chromium for ingot molds. The use of the electric furnace made a

large recovery of the alloys possible and the control of composition more exact. Low sulphur content can also be attained and alloys with low total carbon content can be produced with comparative ease. Dense, close grained pearlitic structures are produced which can be machined readily at much higher Brinell hardness figures than is possible with ordinary gray iron by the elimination of hard spots, chilled corners and by securing a more even distribution and finely divided state of the graphite. Such castings have been made with a tensile strength of over 40,000 lb. per sq. in. and a transverse strength of 4550 lb. (THE IRON AGE, Sept. 16, 1926, page 764).

Less Brittle Malleable Castings

L. H. Marshall, in a paper entitled "A Process for the Prevention of Embrittlement in Malleable Cast Iron," presented at the February meeting of the American Institute of Mining and Metallurgical Engineers in New York, describes his experimental work in isolating the cause of embrittlement in malleable castings which have been galvanized by the hot dip process. He advocates a heat treatment which consists in heating the piece to about 1200 deg. Fahr., followed by quickly cooling, preferably by quenching in water, which it is claimed eliminates any tendency to embrittlement in galvanizing. The heat treatment is carried out previous to galvanizing and is conducted either in a rotating oil-fired furnace or in an oil-fired semi-muffle furnace (THE IRON AGE, Feb. 25, 1926, page 558). It is said that 20 to 40 per cent of the losses in the production of certain types of malleable castings is eliminated by this process.

R. D. Allen presents the results of studies of the cause of embrittlement of black-heart malleable iron resulting from heating overstrained material (*Transactions*, American Society for Steel Treating, Vol. 10, October, 1926, page 630). The author advances an explanation of the causes which have been found to contribute to this difficulty and prescribes a heat treatment which may be applied to reclaim the original qualities of malleable iron that is known to have been subjected to conditions conducive to brittleness. He recommends a heating to 1200 deg. Fahr., followed by quenching in water and states that such a heat treatment does not appreciably affect the properties of malleable castings which have not been previously subjected to strain.

Important Alloy Steels Appeared

A REVIEW of the field of chromium alloys, especially chromium-iron alloys, for their application in chemical apparatus for the resistance to chemical action was described by C. E. MacQuigg at the Berlin, N. H., meeting, June, 1926, American Institute of Chemical Engineers (see also THE IRON AGE, Aug. 12, 1926, page 416).

Stainless iron is discussed by N. L. Mochel (*Transactions*, American Society for Steel Treating, Vol. 10, September, 1926, page 353). Data are given as to the physical properties of low-carbon chromium-iron alloys known commercially as "stainless iron.". The alloys tested varied in composition and in heat treatment. Especial attention was given to elastic limit and impact values. The effect of varying chromium content, and of silicon, copper and nickel on the physical properties, microstructure, resistance to corrosion and workability of the alloys is discussed.

The behavior of carbon in a high-chromium rustless iron is discussed by M. A. Grossmann (*Transactions*, American Society for Steel Treating, Vol. 10, September, 1926, page 436). The carbon in a high-chromium iron was found to be distributed non-uniformly after heat treatment. Separate austenite areas were found in equilibrium with regions of alpha iron. The metal is still soft after rapid quenching from a high temperature because most of it has remained as alpha iron, but the ductility of the metal is decreased greatly because of the formation of well distributed austenite areas, and these upon quenching become martensitic (and therefore hard) and so interfere with deformation.

The results of some tests on a new low-carbon, high-silicon structural steel known as "F" or Freund steel is reported by Dr. H. W. Gillett of the U. S. Bureau of Standards (THE IRON AGE, Aug. 19, 1926, page 481). Similar steels were described by Paglianti in *Metallurgie*, Vol. 9, 1912, page 217, and by Bisset in THE IRON AGE, Aug. 25, 1910, page 442, but the development of quantity production seems to be comparatively recent. It is said that the steel contains 1 per cent silicon and 0.15 per cent carbon, this combination giving a high yield point and ductility.

Special Manganese Steel for Rails

A special manganese steel for railroad rails is described in THE IRON AGE, Feb. 4, 1926, page 336. H. J. Force of the Delaware, Lackawanna & Western Railroad has used experimentally for several years a railroad rail made of steel with carbon from 0.30 to 0.85 per cent; manganese 1.15 to 1.90 per cent; phosphorus not to exceed 0.05 per cent and silicon not to exceed 0.30 per cent. It is claimed that rails made of such steel roll easily at the proper temperatures and have increased wearing properties. It is also claimed that by the use of such a steel a considerably smaller section can be employed with entire safety and that all methods of heat treatment can be eliminated. Mr. Force states that it is exceedingly important in making such a steel that the manganese be added in the furnace before the steel is teemed into the ladle.

New Case-Hardening Steel Offered

The Jones & Laughlin Steel Corporation has developed a new steel known as "Jalcase" which is adaptable for forging and case-hardening and yet has the machinability of ordinary free cutting steels (THE IRON AGE, Aug. 26, 1926, page 546). The results of certain tests show that case-hardened steering worms of Jalcase machined 23 per cent faster that S.A.E. 1020 steel and showed a normal case, free from soft spots, and tested 60 Rockwell hardness (C scale). It is claimed that the rate of carbon penetration is greater by 15 to 25 per cent than in some grades of case-hardening steel and that there is little distortion after heating and quenching. Other machine tests showed Jalcase steel to have better machining properties than S.A.E. 1020. Jalcase is said to contain 0.12 per cent sulphur, 0.12 per cent carbon and 1.40 per cent manganese.

New Light on the Iron-Tungsten System

W. P. Sykes (*Mining and Metallurgy*, February, 1926, page 75), discusses the results obtained from the study of the iron-tungsten system and finds that in carbonless alloys of these metals the Brinell and Rockwell hardness increases with the addition of tungsten in amounts up to about 50 per cent by weight. He shows that the hardness of some of these alloys, water quenched from 1500 deg. C., is increased as much as 130 per cent by aging at temperatures from 600 to 700 deg. C. The tensile strength is increased in the same manner by aging but decrease in ductility accompanies this. Development of secondary hardness in these alloys is accompanied by precipitation of the compound

Fe_2W_3 but the particle size of the precipitate remains sub-microscopic until the hardness has passed through its maximum value and has fallen off considerably.

E. C. Bain (*Transactions*, American Society for Steel Treating, January, 1926, page 9) describes the nature of the alloys of iron and chromium which involves the possible formation of a delta allotropic form of iron solid solution.

Much Attention Paid to Welding

A COMPREHENSIVE paper on the welding of iron and steel (THE IRON AGE, Oct. 28, 1926, page 1194) was read by Dr. C. A. Adams, at the May meeting of the American Iron and Steel Institute. The author concludes that the establishment of welding as a dependable industrial tool has opened up a new era as to economies and other gains which may be effected in fabrication. He pointed out the most important factors entering into the making of successful welds. Among these are skilled workmanship, supervision, inspection, proper welding wire and base material, design, proper technique and suitable apparatus.

At a meeting of the American Welding Society held in Buffalo, Nov. 16 to 19, R. A. Weinman described welding in the atomic hydrogen flame (THE IRON AGE, April 8, 1926, page 989, and Nov. 25, 1926, page 1485). The process was developed at the plant of the General Electric Co., Schenectady, N. Y., by Dr. Irving Langmuir. A similar process has been developed at the Lynn works of the same company by P. P. Alexander. In both processes air is excluded from the metal by means of a bath of hydrogen or other gas. It is claimed that the formation of oxides and nitrides is thus prevented, the fused metal being as strong and ductile as the original metal. The apparatus is still in the experimental stage but it is hoped that it will soon be on the market.

High Points in Metallography Last Year

ANSON HAYES and H. U. Wakefield (*Transactions*, American Society for Steel Treating, Vol. 10, August, 1926, page 214) discuss the carbon content of pearlite in iron-carbon alloys containing one per cent silicon. They find a value of 0.669 per cent carbon.

A. Allison (THE IRON AGE, July 8, 1926, page 73) describes spheroidization in steel and the method of its occurrence. He points out its relation to grain growth and grain boundaries and gives an explanation of Stead's brittleness.

V. N. Krivobok discusses dendritic crystallization and grain formation in steels (*Transactions*, American Society for Steel Treating, Vol. 10, November, 1926, page 758). He maintains that dendritic segregation is not the sole cause of defective steel and that a pronounced dendritic structure is not sufficient cause for the rejection of steel.

H. S. Rawdon, Peter Hidnert, and W. A. Tucker (*Transactions*, American Society for Steel Treating, Vol. 10, August, 1926, page 233) discuss some effects of hydrogen on iron and their bearing on a reported transformation at 698 deg. Fahr. By means of thermal analysis an "irregularity," appearing as an evolution of heat upon heating, the maximum being around 572 deg. Fahr., was detected in some iron specimens, the effect being more pronounced in specimens which had been heated in hydrogen. An irregularity in thermal expansion around 698 deg. Fahr., was likewise detected in some similarly treated specimens. Iron containing an appreciable amount of iron oxide showed this phenomenon best. Iron charged with "cathodic" hydrogen behaved irregularly in thermal analysis on heating, but showed an absorption of heat. The results of the investigation did not confirm the existence of the reported transformation.

Some Phenomena in Recrystallization

J. R. Freeman, Jr., reports results obtained from the study of the recrystallization temperatures of cold-rolled electrolytic iron and open-hearth steel strip (*Transactions*, American Society for Steel Treating, Vol. 10, July, 1926, page 67). This study is a continuation of a previous investigation of the comparative cold-rolling characteristics of the two types of material. Tensile tests and microstructural studies were made. It was found that electrolytic iron underwent a marked recrystallization when annealed for one-half hour at 930 deg. Fahr., coincident with a pronounced decrease in tensile strength. Incipient recrystallization was noted in a specimen annealed for 24 hr. at 750 deg. Fahr. In the open-hearth steel a similar marked recrystallization was observed in specimens annealed at 1110 deg. Fahr., while no marked change was observed in specimens annealed for one-half hour at 930 deg. Fahr. The conclusion was reached that electrolytic iron would probably give somewhat superior material for deep drawing operations.

V. N. Krivobok (*Mining and Metallurgy*, June, 1926, page 262) has made a photomicrographic study of the process of recrystallization in a cold-worked iron-silicon alloy and also in some exceptionally pure electrolytic iron which had never been melted. It was deduced from this investigation that when metal is subjected to cold work, the orientation of its grains as a whole is undoubtedly preserved, while distortion is highly concentrated and affects only minute volumes of crystalline material. These portions take the form of narrow streaks, straight in general direction, bounded by lines sometimes smooth but generally arranged in saw-tooth pattern. When this cold-worked metal is heated the portions previously distorted tend to revert to the most stable and stress-free conditions. Those areas where the bonds of the old structure are most completely loosened will recrystallize first with new orientation. Such small grains are found to grow at first in such a way as to cause recrystallization within the "markings," the metallic mass between remaining unaffected. As the process of recrystallization continues the grains penetrate a structureless mass until finally the whole body of the metal is completely recrystallized.

In a paper entitled "Effect of Air Gap in Explosive System on Production of Neumann Bands" (*Mining and Metallurgy*, February, 1926, page 75), F. B. Foley and J. E. Crawshaw publish results indicating that when an explosive is set off close to a low carbon steel specimen, the metal shows numerous Neumann bands. With an air gap up to 16 mm. between the explosive and the specimen there is little change in the microscopic appearance of the specimen but, with greater air gaps, the number of Neumann bands appears to decrease gradually until with an air gap of 128 mm. no bands appear at the center of the specimen. The results also indicate that an accurate determination of the losses of metal specimens by solution in dilute hydrochloric acid will probably show a relationship to

exist between the solubility of the metal and the degree of deformation or twinning.

Ingot Iron Hardened by Annealing

In a paper "The Effect of Annealing Upon the Hardness of Cold-Worked Ingot Iron" (*Mining and Metallurgy*, February, 1926, page 77), C. Y. Clayton gives the results of tests made by cold compressing ingot iron containing 0.03 per cent carbon and shows that, regardless of the amount of cold work, such metal hardens upon being annealed at a temperature between 250 and 425 deg. C. Samples compressed under loads of 20,000, 30,000, 35,000 and 40,000 lb., respectively, softened when they were annealed between 500 and 600 deg. C., but samples compressed under 10,000 and 15,000-lb. loads did not soften when they were annealed.

Theories of Hardening Reviewed

Dr. Albert Sauveur, at the February, 1926, meeting of the American Institute of Mining and Metallurgical Engineers, read a paper on "The Current Theories of Hardening of Steel, Thirty Years Later." This summarizes the condition of the hardening theories at that date and makes a critical study of the opinions of some 24 metallurgists representing the United States, Great Britain, France, Italy, Sweden and Japan, as to the nature of martensite, the cause for its hardness, the conditions necessary for its formation and the mechanism of that formation.

M. A. Grossmann and E. C. Bain (*Transactions*, American Society for Steel Treating, February, 1926, page 259) describe the nature of some low tungsten tool steels. The tests involved the measurement of their hardness, toughness, shrinkage and structural properties.

Howard Scott (*Transactions*, American Society for Steel Treating, February, 1926, page 277) investigated the dimensional changes accompanying the phenomena of tempering and aging tool steels. He showed that contraction with time is identified with the initial contraction on tempering, and expansion with the expansion on tempering which follows the initial contraction. He includes a list of 17 references to other articles of interest in this connection.

W. L. Fink and E. D. Campbell (*Transactions*, American Society for Steel Treating, May, 1926, page 717) discuss the influence of heat treatment and carbon content on the structure of pure iron-carbon alloys. The experimental work included a rather complete study of the alloys with the X-ray spectrometer and the article contains a selected bibliography of some 79 references of interest.

A new etching solution has been devised for steel by J. R. Vilella (THE IRON AGE, March 18, 1926, page 761). He has found methods of etching iron-chromium base alloys with solutions of aqua regia in glycerine, consisting of 1 part nitric, 2 parts hydrochloric and 3 parts glycerine, all by volume.

Heat Treatment Recommended for Carbon Steels

F. B. Foley, C. Y. Clayton and W. E. Remmers in a paper presented before the American Institute of Mining and Metallurgical Engineers (*Mining and Metallurgy*, February, 1926, page 73), present the results of an investigation into the behavior of steel containing respectively 0.52 per cent and 0.75 per cent carbon under the influence of various treatments by a proper control of the time and temperature factors. They obtain the best combination of physical properties with plain air cooling and recommend, as a treatment for obtaining the best combination of physical properties from annealing carbon steels, that they be first normalized and thoroughly reheated to the lowest point practicable above the critical temperature, held a very short period of time and then cooled by the fastest rate which will permit lamellar pearlite to form.

They obtain some extraordinary impact tests from steel containing 0.52 per cent carbon by quenching in water from the neighborhood of 1000 deg. C., followed by drawing at temperatures varying from 450 to 675 deg. C. and find that these results are higher than when the preparatory hardening is done from temperatures nearer but above the Ac_2 point; although the use of such high quenching temperatures in the case of intricately shaped pieces is apt to cause cracking.

Other Developments in Various Processes

THE Bureau of Standards has been studying the testing of metals at high temperatures under tension while subject to static stresses over long periods and, during the work, short time tests were developed for obtaining useful relations by which a rapid approximation of load carrying ability could be made. The work included the construction of a special extensometer by which it is possible to measure at various temperatures strain of the order of a few millionths of an inch (*Iron Trade Review*, Aug. 5, 1926, page 319).

J. C. Kielman describes the forging of ball bearings by the upset process. The advantages of the method are discussed and compared with other methods. The problems of forging dies and the steels used in making them are dealt with. (*Transactions*, American Society for Steel Treating, Vol. 10, October, 1926, page 599).

A. J. Porter, Jr., (*Transactions*, American Society for Steel Treating, Vol. 10, September, 1926, page 447) outlines briefly the development of the die block to meet the demands placed upon it through the rapid growth of the drop forging industry. Suggestions as to a commercially proper method of hardening are given and some space is devoted to explaining ways in which die blocks are mistreated thus causing breakage. Arguments are advanced for the heat treated die block.

An electrically heated furnace for normalizing steel ring gears for automobiles is described in THE IRON AGE, Feb. 11, 1926, page 401. The important feature is that the work enters and is discharged from each end. The cold work entering either end absorbs the heat from the hot work coming out so that the former is preheated and the latter is partially cooled. It is claimed that over 50 per cent of the heat from the work is reclaimed by being absorbed by the cold work. The furnace is known as a compensating type furnace. Another furnace is also described which is electrically heated and is of the vertical pusher type for the hardening of ring gears after carburizing. It is entirely automatic in operation except for the feeding of gears into the furnace and removing them from it.

The Atlantic Wire Co., Branford, Conn., has installed a new Lavite annealing process for annealing wire in salt baths (THE IRON AGE, April 1, 1926, page 928). The process consists in immersing the coils of wire in a liquid salt bath, maintained at the annealing temperature, 1200 to 1300 deg. Fahr., until the wire comes to the bath temperature, usually for a period of 12 to 17 min. It is said to be giving excellent satisfaction.

Jerome Strauss (*Transactions*, American Society for Steel Treating, April, 1926, page 571) discusses the cutting ability of tools and tool steels and the cutting resistance of metals. He points out general precautions necessary to be taken in the various methods of

testing. He includes a selected bibliography of some 33 references on the subject.

New Testing Instruments and Machines

A NEW thermometer similar in action to the ordinary mercury thermometer has been evolved at the Thomson Research Laboratory of the General Electric Co. The stem and bulb are of clear fused quartz and, instead of mercury, metallic gallium is used. This thermometer is capable of registering temperatures over 1800 deg. Fahr., but has been used only for scientific investigation. (*Iron Trade Review*, Feb. 4, 1926, page 330).

A special machine for testing materials for fatigue has been devised by R. R. Moore, Dayton, Ohio. (THE IRON AGE, Oct. 28, 1926, page 1209). It is claimed that the machine, which is of the plain bearing type, runs quietly and with no vibration. It has a permanent moment arm to insure accuracy and consistency between tests. It has unrestricted beam action, employs a simple specimen and is adaptable to various lengths of bars.

The wear of steels with particular reference to plug gages has been studied by H. J. French and H. K. Herschman (*Transactions*, American Society for Steel Treating, Vol. 10, November, 1926, page 683). A new gage wear testing machine is described and results obtained by its use are discussed for wet sliding friction of metal on metal and wear by abrasives. Comparisons of service wear tests at different plants with results obtained in the laboratory with the gage wear tester are included. Data are presented to show that file hardness is not a criterion of good wear resistance of gages. Chromium-plated gages are compared with gages made from heat-treated steels of the customary types.

X-ray Tests

John T. Norton (THE IRON AGE, Aug. 12, 1926, page 409), describes the testing of welded joints by means of X-ray apparatus and concludes that radiographs will definitely show, in the case of welded joints, inclusions of gas, slag, oxide or other impurities whose thickness in a direction parallel to the X-ray beam is more than 5 per cent of the total thickness of the sample; they will show the presence of cracks or seams which are nearly parallel to the direction of the X-ray beam but will not show cracks which are normal to it; the method will not tell anything about the crystalline condition of the metal; it will, however, indicate the failure of welding material to join the base metal plates.

Ancel St. John (THE IRON AGE, Sept. 16, 1926, page 783), describes mobile X-ray equipment for examining castings, welds and metals where located.

Metallographic Technique Improved

F. F. Lucas describes, in a paper presented at the February meeting of the American Institute of Mining and Metallurgical Engineers, his work in ultra-violet metallography. He claims to have obtained crisp brilliant images, at magnifications up to 1600 diameters, which surpass in quality those obtainable with the apochromatic system. He expects the ultra-violet microscope to develop much new information but points out that its technique is the most complicated of any within the realm of technical or scientific microscopy. (THE IRON AGE, Feb. 25, 1926, page 555).

SCRAP PRICES FALLING

Both Pig Iron and Finished Steel Are Higher Than in Summer

Average prices of heavy melting steel scrap at Chicago, Pittsburgh, and Philadelphia in December were $15.08 per gross ton, compared with $15.25 in November with a recent high of $16.25 in September. The September figure was, with the exception of January ($16.97), the highest of the year.

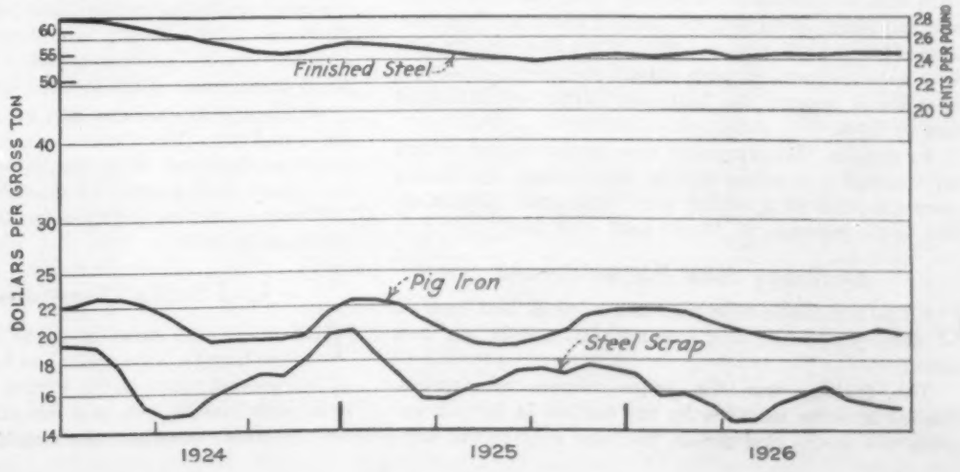
While pig iron has weakened recently, it is considerably higher than it was at the time of the peak of scrap prices. This peak occurred in the first week in September, when the figure was $16.58 per ton, since which time a reduction of $1.50 has been experienced. Pig iron, on the other hand, is about 50c. higher per ton than it was early in September, while finished steel averages 28c. per ton higher than it did early in September.

The table shows the history for all three composite prices over the past two years, month by month. It will be noted that the yearly average for 1926 was in all cases below the yearly average for 1925. With regard to pig iron and finished steel the average reduction was 16c. and 52c. respectively. For scrap, however, a reduction of $1.64 was shown. The diagram covers the information for the past three years.

Composite Prices on Iron and Steel Products

	Steel Scrap	Pig Iron	Finished Steel, Per Lb.
January, 1925	$20.10	$22.44	2.560c.
February	18.27	22.50	2.546c.
March	16.92	21.99	2.537c.
April	15.48	20.95	2.503c.
May	15.46	19.85	2.460c.
June	16.09	19.22	2.440c.
July	16.46	18.96	2.435c.
August	17.23	19.01	2.413c.
September	17.42	19.38	2.397c.
October	17.08	19.92	2.405c.
November	17.62	21.17	2.433c.
December	17.37	21.54	2.450c.
Year's average	*17.12*	*20.58*	*2.465c.*
January, 1926	16.97	21.54	2.447c.
February	15.50	21.52	2.428c.
March	15.83	21.39	2.433c.
April	15.27	20.52	2.439c.
May	14.35	20.27	2.416c.
June	14.40	19.82	2.420c.
July	15.42	19.51	2.431c.
August	15.88	19.46	2.431c.
September	16.25	19.46	2.439c.
October	15.58	19.69	2.449c.
November	15.25	20.13	2.453c.
December	15.08	19.94	2.453c.
Year's average	*15.48*	*20.42*	*2.439c.*

For a Solid Two Years the Trend of Steel Scrap Prices Has Been Downward. From $20.10 in January, 1925, the drop has brought an average of $15.08 in December just past. A differential of $2.34 with pig iron has become $4.86



World Steel Output 89.5 Millions

United States Made 54 Per Cent of All—New Post-War Record in Pig Iron—Exports Now Exceed Pre-War Volume

BY EDWIN F. CONE

A NEW record in the world's steel production was made last year at 89,500,000 *tons. The American proportion of this—*48,250,000 *tons—was about* 54 *per cent. The steel output of the six leading countries in* 1926 *of* 77,515,000 *tons was* 1,000,000 *tons larger than that of* 1925 *and about* 12,800,000 *tons larger than the* 64,700,000 *tons made in* 1913.

For the first time since the war, the gross steel exports of the world exceeded those of 1913. *Using the records of the six leading producing nations, the combined exports were about* 7.5 *per cent larger than the pre-war record of* 1913 *and nearly* 11.5 *per cent in excess of those of* 1925. *It has taken eight years for the fulfillment of the prophecy, made at the close of the war, that the "world hunger" for steel would soon be felt in exports.*

New records were made by all countries last year, in both production and exports, except Great Britain. The feature was the notable expansion of the German industry, especially in exports.

Three countries last year made more pig iron than steel—France, Belgium and Luxemburg. The total pig iron output of the six leading producing countries moreover, was the largest since the war, although it fell short of that for 1913.

Six Countries Produce and Export the Bulk

SIX nations—the United States, Great Britain, Germany, France, Belgium and Luxemburg—produce the great bulk of the world's output of pig iron and steel. A review of the production, as well as the exports, of these six countries is presented in the following paragraphs—as a basis for appraisal of the world's record last year compared with other years. The data are largely those collected by the National Federation of Iron and Steel Manufacturers of Great Britain. Steel production includes steel castings in all the tables, but in the data for exports scrap is not included.

America Makes New Steel Record

THE largest production of steel ever made by the American industry was the feature last year. With December ingot production estimated and the steel casting output placed at about 1,250,000 gross tons, the year's steel output will approximate 48,250,000 tons. This tops the best previous record of 45,393,500 tons in 1925. The best war record was 45,060,600 tons in 1917.

In pig iron, last year was not a record. With the estimated production at 39,500,000 tons, the 1926 output will fall short about 861,000 tons of the record production of 40,361,100 tons in 1923. It will probably also rank as the second largest output on record, exceeding by a small margin the best war output of 39,434,800 tons in 1916.

In exports the expansion was larger, a new record for the last five years having been made. Estimates place the total at 2,100,000 tons with scrap eliminated. This is an increase of 25 per cent over 1925.

Germany Now Ranks Second

GERMANY made new post-war records last year in steel production and exports, but not in pig iron output.

The feature was the large volume of exports. Swelled in some measure by the decline in British exports, due to the coal strike, the total rose to the commanding figure of 4,825,500 tons, the largest of any other nation and nearly 1,600,000 or 50 per cent in excess of the 1925 achievement.

The steel production of 12,117,400 tons was the largest since the war and compares with 17,348,400 tons in 1913, when the total was swelled by the districts now no longer part of Germany. Pig iron output at 9,394,700 tons was less than in 1925, but otherwise the largest since the war. Early in 1926 the rate of production of both pig iron and steel was low, increasing in volume by nearly 50 per cent toward the end of the year.

French Industry Still Expanding

NEW records were made by France in 1926. The pig iron production at 9,206,700 tons is 845,100 tons or 10.1 per cent better than that of 1925 and has never before been equaled. In 1913 it was 5,124,000 tons and only 3,380,400 tons in 1920. Before the war Alsace-Lorraine did not contribute to the French total.

The estimated steel output of 8,250,700 tons also tops all previous records and places France third among the steel producing nations last year. The output last year was nearly 80 per cent larger than in 1913, but now the Alsace-Lorraine industry contributes probably 35 to 40 per cent of the present production.

In exports the volume last year was notable. Since the war France has risen to a commanding position in world competition. With her exports at 3,921,900 tons last year, they exceed by a comfortable margin the 1925 record and are nearly seven times the 578,400 tons exported in 1913.

Coal Strike Disastrous to British

THE great coal strike in Great Britain, which lasted from May to November, has been the cause of one of the poorest years in the British steel industry. Records were broken, but in a far different manner from that in other countries—the smallest pig iron and steel

production since the war—even less than in the year 1921 of severe world-wide depression.

Only 2,418,500 tons of pig iron is estimated to have been made. In 1921 the production was 2,616,000 tons. Only 3,391,000 tons of steel was made last year, which compares with 3,705,200 tons made in 1921. Pig iron output in 1926 was the smallest since 1886, when 2,263,880 tons was made, and steel production was the smallest since 1895, when the total was 3,259,900 tons.

Exports were maintained at fairly full volume, considering conditions. At 3,004,000 tons the total was only about 725,000 tons under the 1925 volume.

Belgium Makes New Records

DESPITE a marked depression in the Belgian industry during the early part of last year, a splendid record in both production and exports was made.

The pig iron output last year at 3,337,900 tons was about one-third larger than in 1925 and easily surpassed any previous year. The steel production also made a new record at 3,313,400 tons, having been the largest recorded and about one-third larger than in the pre-war year, 1913.

The exports, which have included those of Luxemburg since 1922, were larger in 1926 than ever before—3,567,500 tons. The next best record was 3,386,400 tons in 1924.

Luxemburg Also Expands

IN both pig iron and steel output, Luxemburg last year surpassed any year since the war. Over 2,455,800 tons of pig iron was made in 1926, but the production is still less than in 1913. More steel is being made than before the war—the 2,192,200 tons made last year

British Iron and Steel Output and Exports During Peace Years in Gross Tons

	Pig Iron	Steel	Exports
1912.....	8,748,000	6,792,000	4,807,200
1913.....	10,260,000	7,663,200	4,969,200
1919.....	7,404,000	7,896,000	2,223,200
1920.....	8,034,000	9,067,200	3,250,800
1921.....	2,616,000	3,705,200	1,696,800
1922.....	4,902,000	5,881,200	3,400,800
1923.....	7,440,000	8,481,600	4,320,000
1924.....	7,318,800	8,221,200	3,853,200
1925.....	6,236,400	7,396,800	3,730,800
1926*.....	2,418,500	3,391,000	3,004,000

*December estimated.

Belgian Iron and Steel Output and Exports During Peace Years in Gross Tons

	Pig Iron	Steel	Exports
1912.....	2,304,000	2,472,000	1,494,000
1913.....	2,445,600	2,427,600	1,550,400
1919.....	247,200	328,800	174,000
1920.....	1,098,000	1,233,600	920,400
1921.....	861,600	753,600	907,200
1922.....	1,578,600	1,540,800	2,110,800†
1923.....	2,149,200	2,234,400	2,494,800†
1924.....	2,763,600	2,816,400	3,386,400†
1925.....	2,502,000	2,372,400	3,153,600†
1926*.....	3,337,900	3,313,400	3,567,500†

*Partly estimated.
†Includes Luxemburg.

Luxemburg's Iron and Steel Output During Peace Years in Gross Tons

	Pig Iron	Steel
1913.....	2,508,000	1,308,000
1919.....	608,000	364,000
1920.....	681,600	560,400
1921.....	955,200	742,800
1922.....	1,658,400	1,371,600
1923.....	1,384,800	1,179,600
1924.....	2,124,000	1,851,600
1925.....	2,307,600	2,049,600
1926*.....	2,455,800	2,192,200

*Partly estimated.

French Iron and Steel Output and Exports During Peace Years in Gross Tons

	Pig Iron	Steel	Exports
1912.....	4,860,000	4,356,000	498,000
1913.....	5,124,000	4,620,000	578,400
1919.....	2,376,000	2,148,000	232,800
1920.....	3,380,400	3,002,400	928,800
1921.....	3,363,600	3,054,000	1,605,600
1922.....	5,146,800	4,464,000	1,936,800
1923.....	5,347,200	5,029,200	2,182,800
1924.....	7,502,400	6,792,000	2,773,200
1925.....	8,361,600	7,299,600	3,860,400
1926*.....	9,206,700	8,250,700	3,921,900

*Partly estimated.

German Iron and Steel Output and Exports During Peace Years in Gross Tons

	Pig Iron	Steel	Exports
1912*.....	15,350,400	16,075,200	5,788,800
1913*.....	16,492,800	17,348,400	6,207,600
1919.....	6,177,400	7,761,800	no data
1920.....	6,933,600	9,133,200	1,723,200
1921.....	8,703,800	9,856,600	2,445,600†
1922.....	9,248,400	11,530,800	2,516,400
1923.....	4,858,800	6,206,400	1,306,800
1924.....	7,689,600	9,681,600	1,536,000
1925.....	10,018,800	12,003,600	3,211,200
1926**.....	9,394,700	12,117,400	4,825,500

*Excluding Luxemburg except in exports.
†Based on 8 months.
**Partly estimated.

American Iron and Steel Output and Exports During Peace Years in Gross Tons

	Pig Iron	Steel	Exports
1912.....	29,727,000	31,251,000	2,418,000
1913.....	30,966,000	31,300,000	2,892,000
1919.....	31,015,000	34,671,000	4,399,000
1920.....	36,926,000	42,133,000	4,706,400
1921.....	16,688,000	19,784,000	2,172,000
1922.....	27,220,000	35,603,000	1,986,300
1923.....	40,361,000	44,943,700	1,926,900
1924.....	31,405,800	37,931,900	1,694,900
1925.....	36,700,500	45,393,500	1,680,000
1926*.....	39,500,000	48,250,000	2,100,000

*December estimated.

World Production and Exports of Steel and Iron as Represented by the Six Leading Nations, in Gross Tons

	1913	1921	1922	1923	1924	1925	1926*
Pig Iron:							
United States.....	30,966,000	16,688,000	27,220,000	40,361,000	31,405,800	36,700,500	39,500,000
Great Britain.....	10,260,000	2,616,000	4,902,000	7,440,000	7,318,800	6,236,400	2,418,500
Germany	16,492,800	8,703,800	9,248,400	4,858,800	7,689,600	10,018,800	9,394,700
France	5,124,000	3,363,600	5,146,800	5,347,200	7,502,400	8,361,600	9,206,700
Belgium	2,445,600	861,600	1,578,600	2,149,200	2,763,600	2,502,000	3,337,900
Luxemburg	2,508,000	955,200	1,658,400	1,384,800	2,124,000	2,307,600	2,455,800
Totals	67,796,400	33,188,200	49,754,200	61,541,000	58,804,200	66,126,900	66,313,600
Steel:							
United States.....	31,300,000	19,784,000	35,603,000	44,943,700	37,931,900	45,393,500	48,250,000
Great Britain.....	7,663,200	3,705,200	5,881,200	8,481,600	8,221,200	7,396,800	3,391,000
Germany	17,348,400	9,856,600	11,530,800	6,206,400	9,681,600	12,003,600	12,117,400
France	4,620,000	3,054,000	4,464,000	5,029,200	6,792,000	7,299,600	8,250,700
Belgium	2,427,600	753,600	1,540,800	2,234,400	2,816,400	2,372,400	3,313,400
Luxemburg	1,308,000	742,800	1,371,600	1,179,600	1,851,600	2,049,600	2,192,200
Totals	64,667,200	37,896,200	60,291,400	68,074,900	67,294,700	76,515,500	77,514,700
Exports‡							
United States.....	2,892,000	2,172,000	1,986,300	1,926,900	1,694,900	1,680,000	2,100,000
Great Britain.....	4,969,200	1,696,800	3,400,800	4,320,000	3,853,200	3,730,800	3,004,000
Germany	6,207,600	2,445,600	2,516,400	1,306,800	1,536,000	3,211,200	4,825,500
France	578,400	1,605,600	1,936,800	2,182,800	2,773,200	3,860,400	3,921,900
Belgium	1,550,400	907,200	†2,110,800	†2,494,800	†3,386,400	†3,153,600	†3,567,500
Totals	16,197,600	8,827,200	11,951,100	12,231,300	13,243,700	15,636,000	17,418,900

*Estimated in part. †Includes Luxemburg. ‡Scrap not included.

is 68 per cent larger than the 1,308,000 tons made in 1913 and exceeds that of 1925.

Luxemburg's exports have been combined with those of Belgium since 1922, due to an economic union established then, hence no data are available. They constitute a substantial proportion of the total.

Production and Exports of the World

A BASIS for comparison of both production and exports is furnished by the combination of the data in the large statistical table.

The notable feature is the total of exports. For the first time since the war, or for the first time in the last eight years, these exports at 17,418,900 tons exceed those of 1913. In other words world demand has regained its pre-war volume, last year's rate being about 7.5 per cent larger than in 1913.

The world's largest production of steel was recorded last year at 77,514,700 tons—about 99,000 tons more than in 1925 and an increase of nearly 20 per cent over 1913.

In pig iron the largest production since the war was achieved but the total of 66,313,600 tons is still less than the world's total in 1913 of 67,796,400 tons.

Germany for the second successive year since the war maintains her position as the second largest producer and exporter.

Analyzing somewhat in detail the world's exports, Germany led last year with 27.7 per cent of the total as against 19.6 per cent in 1925. France was second at 22.5 per cent of this year's total against 24.1 per cent in 1925, although her total was larger this year. American exports expanded last year to 12 per cent of the total as against 10.8 per cent in 1925. The miners' coal strike cut down the proportion for Great Britain from 24.1 per cent in 1925 to 17.2 per cent in 1926.

Pig Iron and Steel Output of All Countries

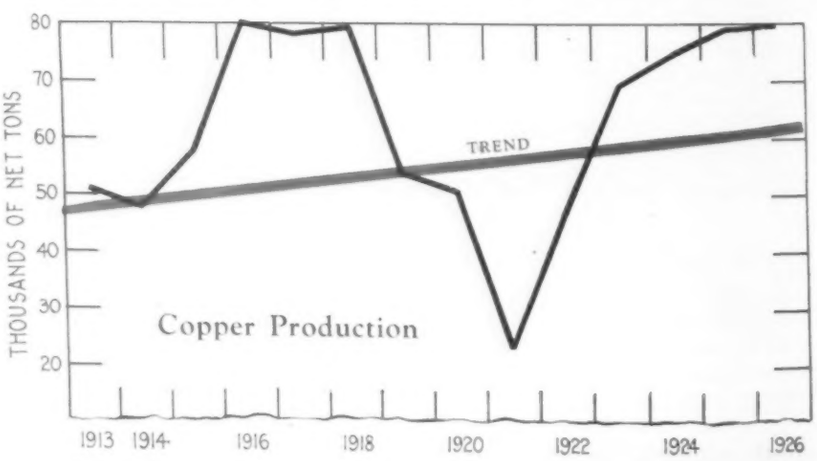
RELIABLE data for 1925 and 1926 covering the pig iron and steel production of most of the minor producing countries are not available. For several of these countries—the Saar, Russia, Poland, Sweden, Italy and Canada—some data are at hand. Estimating the output for the other countries—Australia, India, Austria, Hungary, Czecho-Slovakia and Spain—the following table for 1925 and 1926 can be compiled as representing the world's total in both pig iron and steel:

	1926	1925
Pig Iron		
Six major countries...	66,313,600	66,126,900
All other countries...	10,350,000	8,535,000
	76,663,600	74,661,900
Steel		
Six major countries...	77,514,700	76,515,500
All other countries...	12,000,000	10,675,000
	89,514,700	87,190,500

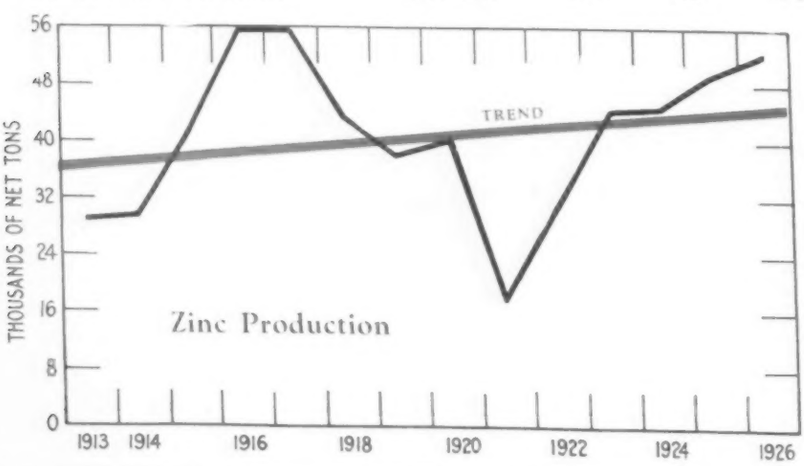
With the world's output of steel last year at 89,500,000 tons, the American percentage of the total was about 55 per cent. In pig iron American furnaces made over 51 per cent of the world's total of 76,663,600 tons in 1926.

Production Trend Lines for Copper and Zinc

COPPER, tin and zinc all show an upgrade in production over the period from 1913 to date. Output of the last four years may represent in part a making up for the deficiency of the three preceding years, or a new high level of production for the future to disclose. It appears that 1926 production of copper is about 30 per cent above the normal trend level. The trend of production is increasing so that each year shows about 1043 tons per month above the preceding year. This gain in production figures out at nearly 24 per cent in 13 years.



Smelter Production of Copper Is at About the Highest Level in the History of the Industry. It matches the great output of the war years, at about 80,000 tons per month. The general trend is upward, with a gain of approximately 12,500 tons each year

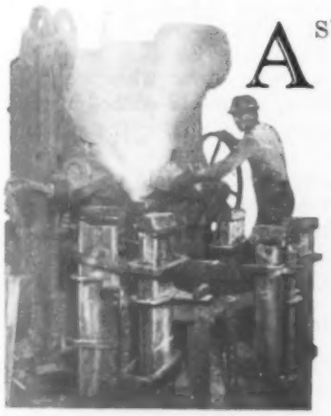


Production of Primary Zinc Is Showing a Moderate Upward Trend, Although No Year Since the War Has Reached the High Figures of 1916 and 1917. Output is above 52,000 tons per month, and the gain is at the average rate of about 7400 tons per year

Progress in Non-Ferrous Metals

Review of Developments in 1926 Reveals Interesting Trends—Copper in the Lead—Revival in Nickel a Feature—Tin Substitutes Increase—Interest in Aluminum Bronzes

BY W. M. CORSE*



A SURVEY of developments in the field of non-ferrous metallurgy during 1926 reveals several main trends. Chief among these is the growing dependence of sales departments on research and development. Making and maintaining sales with engineering knowledge as a foundation was recognized as good business to a greater degree than ever before during 1926. To be sure, good-fellowship and personality play their inevitable part in making sales, but these qualities are strongly supplemented by accurate technical data. This use of such data to further sales development is not entirely new, but it has been adopted widely in the metal business during 1926, especially by progressive and forward-looking concerns.

In the second instance the need for new materials is becoming paramount. The ever-increasing requirements of a highly industrialized civilization have created demands for alloys to withstand stress and strain, corrosion, and temperature changes to an extent heretofore undreamed of—demands which old materials cannot be expected to fill. The compounding of these alloys is becoming increasingly important, and the last year has seen the chemist and metallurgist in direct charge of melting operations, as never before. More and more he is assuming responsibility for the quality and composition of the material melted.

The activities of the metallurgist, supplemented by those of the physicist and the electrical engineer, are making large contributions to our stock of information on metals, new and old. They, in turn, are aided by instruments of extreme accuracy and inestimable potentialities. The pyrometer, for one, was a laboratory curiosity a few years ago—today it is a necessary instrument in determining metal temperatures. The eye, to be sure, is still depended on for temperature determination but, in metallurgical operations, it is the custom to check by the pyrometer because human organs do not react with the same accuracy at all times and under varying conditions.

The metallurgical microscope has opened the door to methods of control not even considered possible until recently. It is indispensable in obtaining high-quality material, particularly in the field of worked metals. This last year has witnessed its use in metallurgical testing to a greater extent than ever before.

The X-ray spectrometer has made possible the study of the atomic structure of metals, and it has been utilized widely in 1926. The ultimate result of the increasing importance of the metallurgist and the perfection of his tools is that scientific information is accumulating so rapidly that it is difficult to keep abreast of it.

Copper Is Still the Leader

TURNING to the consideration of specific items of development affecting the various non-ferrous metals, copper is still the leader in the group as well as the most important base metal for alloys. The average quality of commercial copper is 99.90 per cent pure. This is an excellent achievement when one considers that charges of 600 tons are often melted in reverberatory furnaces.

During the past year a demand has developed for oxygen-free copper for special purposes, and the refiners have been producing a small amount of copper absolutely oxygen-free. The removal of this last per cent of oxygen is usually accomplished by the use of phosphorus. Production of pure copper of this kind is a difficult operation, and the refiners should be complimented on their success in meeting this demand.

Hardened Copper Has Been Developed

A series of very interesting and novel copper alloys developed by the Union Carbide & Carbon Research Laboratories, Ltd., Long Island City, N. Y., gives promise of becoming of considerable commercial importance. These alloys, which may quite properly be described as "hardened copper," consist of copper, a small amount of silicon and another metal in just the right proportions to form a silicide of the added metal. A comparatively simple heat treatment precipitates the silicide uniformly throughout the alloy imparting to it some rather unexpected properties. Because of the relatively small percentages of the silicides present and the fact that these are precipitated out during the heat treatment, the alloys retain the qualities of pure copper to a remarkable degree. They may be rolled, drawn, or otherwise worked either hot or cold, quite like pure copper. Their electrical conductivity is excellent; for example, a copper-chromium-silicon alloy, after being hard drawn, had a tensile strength of 80,000 lb. per sq. in. and an electrical conductivity of 80 per cent of pure copper. The tensile strength and the hardness of these alloys may be varied between

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wide limits by varying the amount of addition agents and the details of the heat treatment. They are, however, much stronger and harder than copper and compare favorably in these respects with the special alloys and bronzes now on the market. Their resistance to chemical corrosion also depends to a great extent on the composition and heat treatment; but, while it is not claimed that they are particularly corrosion resistant, some alloys have shown excellent resistance to corrosive action of a number of solutions.

In the brasses there is a steady but slow trend away from the high-zinc alloys toward higher copper alloys for engineering purposes, and this trend will probably be even more pronounced in the near future.

This means an increased demand for special bronzes such as aluminum bronze, silicon bronze and other alloys containing metals not usually found in the casting shop. It also means replacement of brass by other alloys of good mechanical properties such as the nickel-copper alloys of high-nickel content.

More Interest in Aluminum Bronzes and Bearing Metals

INTEREST is increasing with regard to various aluminum bronzes where high strength, resistance to fatigue, wear and corrosion are important factors. These aluminum bronzes may contain iron or nickel, and certain special formulas have been given such trade names as "Alcumite," "Hills McCanna No. 45," "Ampco Bronze," etc. They are being used in the oil refineries, in the automobile gear field, and in the field for chemical apparatus which is exposed to special types of corrosion. These include apparatus subjected to acid fumes and to certain sulphur containing gases. They have nearly all of the qualities of steel without its tendency to corrode, and as uses are found for them they will become valuable materials for engineering purposes.

Corrosion Still Under Investigation

The subject of corrosion has attracted a great deal of attention during the past few years. So much so that the non-ferrous corrosion committee of the American Society for Testing Materials is attempting to determine a reliable accelerated corrosion test. It is too early yet to state whether or not this will prove successful. But the fact has been established that it is impossible to predict, from one set of data, what may happen in different places under what seems to be a duplication of conditions. The old method of trial and error must still be depended on for the present, at least.

It is important to note here that all of the non-ferrous alloys resist corrosion to a considerable extent. Each has its own special field of usefulness, and the problem from both the sales and economic viewpoints is to find out what that special field is.

Studying Metal for Bearings

The program of bronze bearing metal research, instituted by the Chicago Bearing Metal Co., and mentioned in the Annual Review Number of THE IRON AGE of Jan. 7, 1926, has progressed satisfactorily. Engineers of tests of railroads have shown marked interest in the project and have met at the United States Bureau of Standards on several occasions. This project involves the study of bearing properties, including wear and lubrication, and is almost the first attempt to get fundamental bearing data on an extensive scale. Wear testing of metals has been a difficult subject, but this research program of 1926 gives promise of substantial progress along this line.

Revival in Nickel Is Notable

NICKEL has staged a tremendous "come back." The tonnage sold in 1926 has exceeded pre-war figures and the market is continually broadening—a truly astonishing performance because the Naval Disarmament Treaty destroyed fully one-half the business of the nickel producers. After the Disarmament Conference the International Nickel Co., the largest producer of nickel in the United States and Canada, immediately established a development and research department, employing some of the best metallurgical men in the country, with the above-mentioned gratifying results. This is one of the best illustrations of the value of research as applied to sales, and a statement to that effect is made by the president of the company in his 1925 report. Moreover, the broader adoption of nickel in its various forms is economically sound because it is based on the vast reserves of nickel bearing ores of Sudbury, Ontario.

Pure Nickel Now Made

The average fire-refined nickel runs about 99 to 99.5 per cent pure. In order to compare with the average commercial purity of copper this should be 99.9 per cent. With this object in view the International Nickel Co. extended its electrolytic nickel operation during 1926 to a capacity of 12,000,000 lb. of nickel per year, with a 99.9 per cent minimum of nickel. This improvement in the purity of commercial nickel is a distinct forward step and worthy of record because new researches of all metals indicate clearly that small percentages of impurities—even a few hundredths of one per cent—exert a profound effect on the properties of the metal itself.

In addition to increasing the plant capacity for the manufacture of electrolytic nickel, the International Nickel Co. has installed new cold-rolling equipment and a strip mill at its Huntington, W. Va., works, thus making possible the production of sheet material with a finish generally superior in character to other rolled sheet materials coming on the market.

During 1926 the standard of nickel plating has been improved to meet the higher standards of other finishes which ordinarily accompany it in the finished form, as in automobiles where the so-called Duco paints have increased the normal life of painted finish from one to five years.

Nickel Alloys Increasing in Use

The high nickel-copper alloys such as monel metal are finding increasing uses. Their properties, in many cases paralleling those of steel, make them much better adapted for certain engineering purposes than the ordinary brasses.

The use of nickel in cast iron in 1926 has made remarkable progress. It improves many of the physical properties of the iron, so that new fields for cast iron containing nickel have been opened up.

Nickel in brass foundry alloys is finding increasing

use. A few years ago it was unusual for the brass founder to think of using nickel in his ordinary alloys, but today it is used both as a densifier and to replace tin which is becoming very expensive.

Nickel Silver for Plumbing

In the plumbing fixture business architects have known for many years that the best commercial fixture was one of solid nickel silver. However, the difficulty in obtaining pressure tight castings has retarded the adoption of this excellent material. The unsightly appearance of the average nickel-plated brass fixture after a few years' use is all too familiar, and the introduction of a uniform metal for this purpose, of the same color and composition throughout would be welcomed. Several companies have produced solid nickel silver castings successfully in 1926. Further research and development along this line by the manufacturers will undoubtedly perfect and put nickel silver on a commercial basis.

Pure nickel in the form of sheet and tubing is now available commercially, a condition not existing prior to 1926, particularly with respect to tubing.

Very pure high-nickel iron alloys have found many uses in the electrical industry. Their unusual magnetic properties have indicated their use in radio equipment for the more perfect reproduction of sound. This newer group of iron and nickel alloys will contribute much to the further development of radio and telegraphic operations. One alloy alone has already increased the carrying capacity of the new ocean telegraph cables above five times.

Magnesium Only Recently in the Field

MAGNESIUM is one of the metals which has but recently entered the commercial field. This always means that a large amount of development and research work has been done which, frequently, is not reflected in immediate sales. The increase of production and sales of magnesium in 1926 was not as great as in previous years, although steady and gratifying in amount. The purity of magnesium is 99.85 per cent, which indicates that the methods of manufacture have been brought to a high degree of perfection. Its light weight always stimulates an interest in its use in aircraft manufacture where lightness is so essential. Magnesium is used in airplane starters, supercharger castings, carbureters, impellers for superchargers, deck plates, etc. As a constituent of an aluminum-magnesium alloy it also finds uses in this field.

The application of magnesium castings for machine-shop jigs is a new use developed in 1926. In a typical installation the saving in weight was considerable, resulting in a corresponding reduction in the time of the operator using this jig. The resonant properties of the metal make it useful in the manufacture of tuning forks, diaphragms in automobile horns as well as those of talking machines and radio loud speakers. Aircraft manufacturers see possibilities in the use of thin gage magnesium for coverings and linings.

Pure magnesium sheet is becoming a commercial proposition in a certain type of radio rectifier. The sales of rod and tubing, wire, ribbon and powder are rising slightly and the use of the metal in the high strength aluminum alloys mentioned above has considerably raised the volume of the ingot sales. Whereas magnesium was used practically entirely as a deoxidiser for nickel alloys a few years ago, it eventually found many new fields as outlined above.

New Uses of Aluminum Not Many

ALMOST important development in the aluminum business during 1926 was the construction and starting of the first unit of the Aluminum Co. of America's new plant at Arvida, Quebec. This plant is the largest one of the aluminum group and places the company in an unusually strong position.

New uses of aluminum in 1926 were not so numerous, but the progress in existing fields was considerable. The use of aluminum conductors increased over that of 1925, and the field was a busy one. The use of aluminum paint, which was limited to comparatively small quantities a few years ago, increased considerably during 1926. This paint consists of aluminum bronze powder mixed with a good spar varnish, and its advantages over other paints are increased durability, covering power and an advantageous price. Considerable quantities were used for painting interiors of factory buildings as well as exteriors. It was also used on bridges and refrigerator cars to good advantage. This paint is rapidly becoming standard for the protection of large steel tanks such as those used for oil and gas.

In the casting field, heat-treated alloys typified by the composition 94 per cent aluminum, 4 per cent copper and 2 per cent impurities are being used to manufacture parts for heavy duty and resistance to shock. Larger castings of this type were made in 1926 than ever before. For example, one large Diesel engine bed made of aluminum weighed 3800 lb. and effected a saving of 5000 lb. in weight over the same piece cast in iron.

Reference was made last year to the increasing use of aluminum and its alloys in naval construction, and this condition remains equally true today. The

Features in Non-Ferrous Development in 1926

Copper Can Now Be Hardened by a New Method
More Nickel Sold in 1926 Than in Any Pre-War Year, Despite Disarmament
Higher Copper the Trend in Brass Composition
Magnesium Castings for Machine Shop Jigs Are a New Development
Antimony Is Now Used in 30 Different Ways
Substitutes for Tin Are Increasing
Interest in Aluminum Bronzes Is on the Increase

railroads are beginning to realize that economy lies in lightening the hauls by reducing weight of equipment, and they are finding aluminum a great help in that direction. One large railroad company is operating an 8-car train of coaches wherein everything above the floor, except the furniture, is made of aluminum. Should this experiment prove successful this field will be tremendous.

Automatic train control cables also utilize a certain quantity of aluminum, and the metal is also being introduced in the railroad field for certain types of furniture, while large office and bank buildings are using aluminum furniture to good advantage.

Considerable of the metal in sheet and shapes is being consumed in the manufacture of electric refrigerators. Aluminum as a roofing material is now being put on the market, and textile machinery, collapsible tubes and screw machine products have all taken their share of this light metal.

Aluminum for Airplanes

In the airplane industry where lightness is an essential factor, aluminum naturally finds a large use. In 1926 nearly all of the propellers for planes were made of aluminum instead of wood as heretofore. One new development in this particular field during the year was the forging of duralumin crank cases for motors.

The fact that the price of aluminum per unit of volume is less than that of copper will open up still wider fields of use for this metal where lightness alone will not justify a premium price. The special properties of the metal will continue, however, to create an increasing demand for its use.

Tin Substitutes Increasing

No new developments of importance are recorded for the tin industry. Its relatively high price, however, has stimulated the attempt to find substitutes as illustrated by the substitution of antimony for tin in lead cable sheathing. In this item alone the Bell system has realized savings of over $11,000,000 in the last 13 years.

Nickel is also being substituted for a portion of the tin in brasses and bronzes with considerable saving, the amount of which has not been calculated.

Antimony Has 30 Odd Uses

Antimony occurs most commonly as a sulphide which is easily liquidated from the ore; therefore the development of new chemical methods of refining has not been urgent. This metal is put to some 30 odd uses in various phases of industry, but in virtually all of these instances a substitute can be used satisfactorily. In fact, many of these substitutes are on a stronger industrial footing than antimony and its alloys; as an example—in the hardening of lead either calcium, barium, strontium, magnesium or copper may be used. Alloys of barium and calcium successfully compete with antimonial alloys as bearing metals. Therefore, if the supply of antimony should be curtailed, the chemist has something to fall back on.

China controls the supply of antimony. Fully 50 per cent of the world production of this metal finds its way into the United States, and in times of peace 75 per cent of our antimony imports are utilized in the manufacture of type metal, anti-friction bearings for machinery, britannia metal and hard metal (antimonial lead).

Uses for Chromium Expanding

Chromium is an alloying metal largely used as a constituent of the many engineering steels utilized in manufacturing heavy-duty machinery. Chromium imparts to special steels those durable properties so necessary to high-speed machining operations. One of its outstanding characteristics is its ability to impart corrosion resistance to other metals with which it is alloyed. Thus, rustless iron, stainless steel and chrome-iron articles are enabled to successfully resist corrosion owing to a chromium content of 10 per cent and upward. Chrome-iron is the most resistant of the three to high temperature oxidation.

Chromium in the form of a thin electrolytic plating resists tarnish to a high degree, and is decorative as well. Its use will undoubtedly widen as the technique of manufacture becomes better developed and understood, and the merit of the product generally appreciated.

The most important of the non-ferrous alloys of chromium are nichrome and stellite. Nichrome, an alloy of nickel and chromium, is used in the manufacture of many of the common electric heating devices, and is resistant to high-temperature oxidation and chemical corrosion. Stellite, an alloy of chromium, cobalt, and tungsten, finds important use in high-speed tools, precision gages and fine instruments.

No Special Developments in Lead

Lead has maintained a relatively high price during 1926, making it more nearly equal in price to copper considered volume for volume. Pure lead in sheet, in pipe and as a constituent of bearing metal still holds a firm place with no immediate sign of displacement. This is due to its peculiarly valuable chemical and physical properties. No spectacular developments have occurred in the lead industry during the year, but it maintains its position in the metal world nevertheless.

Electrolytic Zinc Holds Its Own

A year ago the shortage of the supply of zinc ore, which had been an important industrial factor for some time, seemed likely to continue, but the prevailing high price for spelter drew out new ore supplies from Mexico and Bolivia, and the wider introduction of the process of minerals separation by selective flotation enabled the beneficiation of ores that previously had not been worked, with the result that the supply to European smelters increased from 110,000 tons to about 150,000 tons per month, and there was an increase in the supply for American metallurgical work at the same time. The consequence was a reduction in the price of spelter. The decline was tempered, however, by the increased consumption of the metal. The value of the ore fell proportionately more than the value of the spelter, becoming eventually a drag on the market. This resulted in a larger margin for the metallurgists who enjoyed a good year, and the miners did not have a bad one.

Conditions were best for the electrolytic producers who occupy an impregnable position and they increased their production, while the American distillers were using only 68 per cent of their capacity whereas in 1925 they were utilizing 69 per cent. These figures indicate clearly that the electrolytic process is more than holding its own.

The very fact that we have more zinc distilleries in the world than consumption warrants, particularly in the United States, produces very competitive conditions, and the entrance of electrolytic zinc to the world's market intensifies this competition. These electrolytic zinc plants are not confined to America, but are projected for Europe as well as Africa. The distillers, therefore, have very strong reasons for improving their manufacturing methods if they expect to hold their share of the zinc business.

Growth of Markets for Copper

United States the Greatest Consuming Country as Well as the Largest Producer— New Uses Have Developed in Recent Years

BY THOMAS D'ARCY BROPHY*

NOT only is the United States foremost among the nations of the world in copper production, but it is also the greatest copper consuming country, due to its unparalleled development of manufacturing industries and its widespread prosperity. The past five or six years have brought a very substantial increase in the consumption of copper through the country, which is due in part to the campaign of research, advertising and general trade development carried on by the Copper and Brass Research Association and its member companies.

Electrical manufacturers constitute the largest group consumer of copper, the reason for which is easily apparent in this age of electricity. The last five years have shown an amazing development of facilities and equipment for electric power and lighting, transportation and communication.

The whole electrical industry is dependent upon copper and its growth is shown by its consumption of the red metal. In 1921 electrical manufacturers of all kinds consumed nearly 450,000,000 lb. of copper; in 1925 this figure had increased to 765,000,000 lb.

Automobile Industry Also a Large User

Outside of the electrical industry, automotive manufacturers represent one of the largest consumers of copper in its native form, as well as in brass, bronze and other alloys.

Copper consumption in automobile manufacture is largely accounted for by such items as starting, lighting and ignition systems, radiator cores and shells, bushings and bearings, gas and oil piping, headlights, hub caps, hardware and metal trim.

Copper consumption in the automobile industry has increased very rapidly since 1921, when it was relatively low, owing to diminished production and the waning influence of war dictated metal substitution. Since that time better construction and design, with added refinements of mechanism and style have contributed largely to ever-mounting car sales and car registration. All this has been reflected in the amount of copper consumed by the automobile industry, as shown by the following figures, which include replacement and repair parts as well as new car construction.

	1921	1925
Car production.....	1,661,550	4,336,754
Car registration.....	10,464,715	19,954,347
Lb. copper consumed..	70,000,000	245,000,000

Radio Use of Copper Shows Large Increase

In 1924 the radio industry consumed between 2,000,000 and 3,000,000 lb. of copper in the manufacture of receiving sets, both amateur and factory made. In the last two years this consumption has shown a surprising increase, due not only to the greater number of sets sold but also to the growing elaboration and refinement of radio sets of all types of design. This is shown by the increase in number of circuits per set and especially the use of brass as a material for panels. The consumption of copper in radio now is running between 8,000,000 and 10,000,000 lb. per year. One of the newest refinements is "shielding"—enclosing each circuit of a set in a grounded sheet copper box—which may of itself in a year's time increase the figure given above to 16,000,000 or 20,000,000 lb.

Electric Refrigeration Brings New and Growing Use

The manufacture of electric refrigeration has reached an importance which makes it one of the largest of the newer consumers of copper. Extended de-

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velopment of the industry which produces equipment for this type of refrigeration has been very rapid during the past year through the linking up of cooperative effort between the manufacturers and the great electric power companies. It is estimated that the 1926 requirements of the industry will total 45,000,000 lb. largely in the form of tube and sheet.

Copper for Locomotive Construction

European countries have always been large consumers of copper for locomotive fire boxes and boiler tubes. Copper fireboxes and copper or brass boiler tubes are standard on the railroads of England, France, Germany, Belgium and Russia and in many of their colonies and dominions.

In order to bring to the attention of American railroad officials the advantages which European railroads have found in copper equipped locomotives—such as improved heat transfer and lowered maintenance, especially in bad water districts—the Copper and Brass Research Association is cooperating with a Western railroad on complete service tests of a powerful locomotive which is equipped with a copper firebox and copper boiler tubes. The number of locomotives on the railroads of the United States totals over 70,000, and the amount of copper sheet and tube which might be applied to any one locomotive would vary from 10,000 to 30,000 lb.

Substantial Increase for Building Purposes

Perhaps of all the markets that have shown a substantial increase in the use of copper and brass none can compare with the building industry. Prior to 1921 the consumption of brass pipe for plumbing was negligible and the use of brass or copper pipe for underground service connection was practically unknown. The same was true of copper downspouts, eaves trough and roof flashings, as well as copper and bronze window screens and bronze weather stripping. In 1922 with a total building volume of $4,920,000,000 the building industry consumed 164,000,000 lb. of copper. In 1926, with an estimated building volume of $5,500,000,000, copper consumption will increase to at least 275,000,000 lb., a growth in five years of 111,000,000 lb. or 68 per cent.

As an example of the tremendous possibility for still further increase of copper, brass and bronze in the building industry, analysis of the potential market for brass pipe will be interesting. There are not less than 12,000,000 residences available for brass pipe installations in the United States and each residence can use from 200 to 1000 lb. of brass pipe, with 400 lb. a fair average. With an allowance for obsolescence of residences before present plumbing needs replacement, it is estimated that the potential market for brass pipe in existing residences is over 2,000,000,000 lb., and that the annual potential market in new house construction is over 100,000,000 lb. A fair estimate of the amount of copper required for equipping the average house with eaves trough, downspouts and roof flashings is 200 lb., which makes the potential market, roughly, half the market for brass pipe.

Various Other Growing Uses

The recent development of several types of copper shingles has materially increased the consumption of copper in the small house field. The average house roofed with copper shingles and fitted with copper gutters, leaders and roof flashings consumes about 600 lb. of copper. It is estimated that the potential market for copper shingles is 2,400,000 squares per year—consuming 48,000,000 lb. of copper.

There is an increased use of sheet copper in the washing machine industry. In 1921 less than 50 per cent of the washing machines having metal tubs used copper; in 1926 probably 95 per cent of the tubs were made of copper, and the amount of metal used was about 15,000,000 lb.

During recent years intensive effort has been made to demonstrate the efficiency of copper lightning rods as a protection against damage by electrical storms and a substantial market has developed in a relatively short time. In the manufacture of lightning rods about 15,000,000 lb. is now used each year. If complete protection by copper lightning rods were provided for all exposed buildings, it is estimated that over 200,000,000 lb. of copper would be required.

The great increase of the past few years in the number of residences wired for electricity has provided a corresponding increase in the market for lighting fixtures. Brass is the material largely used for fixtures for residences, and bronze for the more architectural type of fixtures for halls, public buildings, etc. For outdoor fixtures, such as porch and garage lanterns and many kinds of traffic signals, sheet copper is used. The lighting fixture industry, as a whole, consumes over 40,000,000 lb. of copper per year in all forms.

Residence Rewiring Offers Fertile Field

According to present-day standards of wiring, and present-day desires for the most convenient use of electric light and power in the home, it may be safely said that all residences built and wired more than two years ago are inadequately wired. The proof of this statement is seen in the widespread use of two and three-way plugs and long extension cords, and the frequent overloading of branch circuits, with resultant blinking of lights and blowing of fuses. To add only two more branch circuits with 10 outlets each, to the number of wired residences as of 1921 (7,714,118) would turn up a new market for copper wire totalling 40,000,000 lb. and a complete rewiring campaign would require well over 100,000,000 lb. of copper.

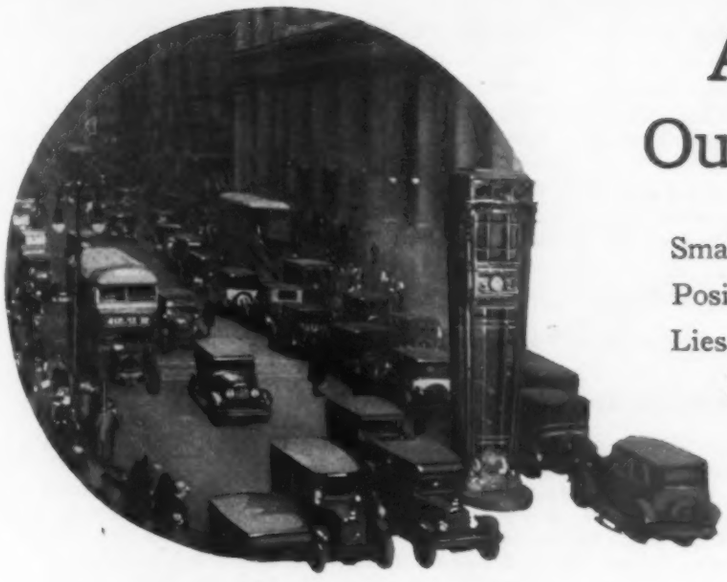
It is particularly interesting to note that the general increase in the domestic consumption for copper has resulted from the development of new industries as well as from extensions in the older and longer established industries. It is safe to say that this feature will continue, and that the progressive development of American industries will result in still further increases in the consumption of copper and its principal alloys, brass and bronze.

Steel Furniture Shipments Continue at High Level

Shipments of steel furniture stock goods in November, at $2,733,686, formed the highest total since April. These figures are obtained from the Department of Commerce from 33 manufacturers, representing the bulk of the business. Already in 11 months of 1926 the figure has exceeded the full 12-month total of any preceding year. The average of the 11 months has been approximately $2,600,000, compared with a monthly average of $2,235,000 in 1925 and less than $2,000,000 for 1924 and earlier years.

Steel shelving shipments were lower in November than in either of the two preceding months, having been $580,072. For the 11 months of the year, however, the total has been greater than that for the 12 months of any preceding year. The average of the 11 months was about $610,000, against a monthly average in 1925 of $556,000 and smaller amounts in 1924 and earlier.

Unfilled orders for steel furniture at the end of November totaled $1,545,428, or somewhat more than one-half month's output. With steel shelving, unfilled orders were $730,846, or about five weeks' work.



Automotive Outlook for 1927

Smaller Producers Holding Their Position—Strength of Industry Lies in Knowing Character and Extent of Its Problems

BY NORMAN G. SHIDLE*

THE automotive industry probably will be just about as good a consumer of steel and steel products in 1927 as it has been in 1926. There are a few signs pointing toward great motor vehicle sales expansion in the next twelve months, but there are plenty of evidences that cars and trucks will be produced in about the same volume in 1927 as in 1926.

Exact predictions, of course, are not only hazardous but impossible even to the closest observers of trends. Present indications, however, point to a total motor vehicle production in 1927 of not less than 3,900,000 and probably not more than 4,500,000 units. Car prices seem unlikely to undergo changes, but dollar-for-dollar transportation value will be greater than before.

The profit margin on cars has been declining for some time and there are no indications of a reversal of trend in that respect, but there are evidences indicating that the future will see a continually decreasing emphasis on mere price as a sales appeal and more and more attention focused on qualities of performance, appearance and design.

Competition during the next twelve months is going to be sharp under any circumstances and extremely keen should any general business recession set in. In 1926, while the industry as a whole has established new output records, the prosperity has been unevenly distributed. Some important, large producers have failed by a considerable margin to equal the profits which they made in 1925, even though, in some instances, they did better their unit volume. As a result, some plants will enter the new year in a much stronger position than others. Several big organizations which have not been as successful in 1926 as in 1925 will be out with new models, new designs and new sales activity, determined to fight their way back to the positions of supremacy which they once held. Other companies which have climbed to new heights in profits and production during the last twelve months will be digging in hard to consolidate the positions which they have won. Still others seem likely to continue on their steady, progressive ways next year as in many years past.

Smaller Producers Holding Their Positions

Concentration of production in a few hands is not progressing so rapidly as might be supposed from general observations and conversations. In the first nine months of 1926, for example, General Motors and Ford—the two largest units in the industry—did only 49 per cent of the dollar volume of business and about 62 per cent of the unit volume. Back in 1914, the 10 makes of cars with the largest production constituted about 84 per cent of the total output for the year. In 1926, after a full dozen years of concentration talk, the 10 best sellers accounted for just about 88 per cent of the total sales made during the first nine months.

It appears also that some of the small producers have been holding their own fairly well so far as number of units is concerned. A list of ten smaller producers, for example (Jordan, Stutz, Auburn, Pierce-Arrow, Gardner, Velie, Marmon, Moon, Chandler-Cleveland, and Locomobile), built 2.1 per cent of the total production of the industry in 1921. For the first nine months of 1926, the combined sales of these same companies was about 2 per cent of the total for the industry.

The fine, outstanding achievements of the big companies in the industry have and will continue to be the center points upon which the stability of the industry rests, but in the process of giving full recognition to those achievements, the existence of a profitable niche for the progressive, smaller organizations is not to be lost to view.

It is significant, moreover, that there are probably fewer automobile companies on the verge of going out of the picture than at the beginning of any year for some time back. The weakest of the weak sisters already have given up the ghost; the tottering towers of motordom grow fewer in number every year; most of those which survive the battle of 1927 are likely to be here to stay.

Installment Buying Under Control

During the past year the worst excesses of the installment buying system have been brought under control. No longer are extremely long terms and extremely low down payments common. The truck as well as the passenger car end of the business has taken drastic steps to procure conservatism in retail financing. The losses accruing to several important finance companies through credits extended in 1925 and coming to fruition in 1926 would seem to insure for the future, not only stronger adherence to sound terms than ever before, but also more careful scrutiny of individual credit risks.

New car stocks in dealers' hands are rather high, but serious overloading has not taken place. The extremely low factory output of November and December has prevented such a contingency, despite the rapid advance in dealers' new car inventories between September and November.

The used-car situation still is hazardous, despite the most strenuous efforts which have been made this year

*Editor, *Automotive Industries*.

both by manufacturers and dealers. The best the combined forces have been able to do is to hold the old enemy at bay. The used-car problem seems likely to continue to be the Old Man of the Sea for the automobile dealer again in 1927 as it has been for a good while past.

Because of the relatively high stocks of old models in dealers' hands and because of the used-car situation, the first quarter of 1927 may well fall behind the first quarter of 1926 in total output.

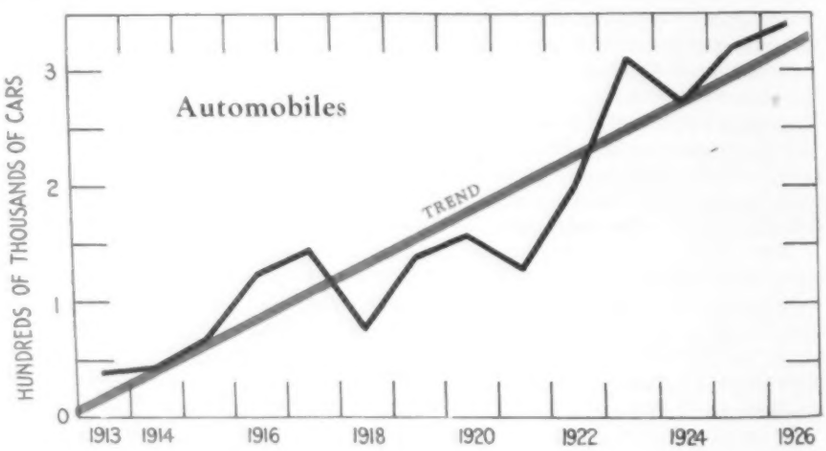
The automotive industry, of course, will be vitally affected by the course of general business, but the outlook now is that general conditions will be such as to permit maintenance by the automobile makers of something like the same pace as the one at which they operated in 1926. So far as the industry itself is concerned, its house is in order, it is well equipped to meet the pressing problems which admittedly exist within its own structure, it has up its sleeve merchandising reserves in the form of new models upon which to call should sales begin to slip seriously and it is going into 1927 with courage, confidence and conservatism.

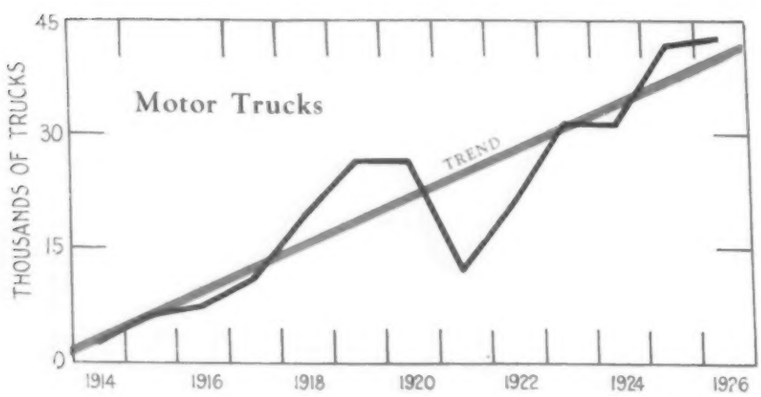
Increasing Demand from the Automotive Field

FIGURES of growth of the automobile trade are here shown as an indirect measure of the rate at which iron and steel are both being demanded for this spectacular industry. In the cases of both passenger cars and motor trucks, the increasing production has been related to a trend line representing the average number of units added each year. For passenger cars it amounts to 275,000 cars more each year and for motor trucks 37,000, a total for the two classes of motor vehicles of 312,000. This index multiplied by the average weight of iron and steel making up the vehicle and more or less indirectly contributing to it gives an idea of the great item in demand on the iron and steel industry that is supplied by the motor car business.

One of the items of steel entering largely into the automobile is sheets. Roughly 30 per cent of the production is so diverted. Other and widely diverse uses have also been developed for sheets and in the short period of seven years shown in the sheet chart, consumption has almost trebled. Normal increase is at the rate of about 340,000 tons per year, thus indicating that the monthly increment over the preceding month is about 28,500 tons.

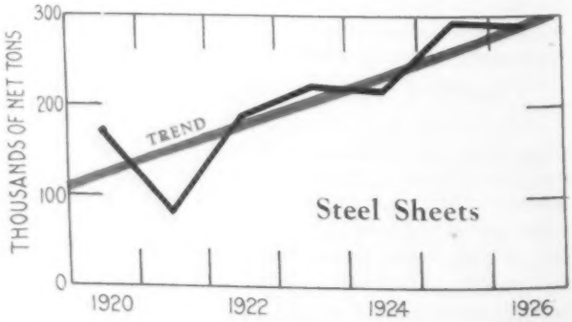
THE Trend of Automobile Consumption Is Increasing Each Year at Such a Rate That Some 23,000 More Cars Are Being Demanded Each Average Month Than in the Corresponding Average Month of the Preceding Year.





THIS Trend Line Shows an Annual Increase, in the Average Monthly Production, of About 3070 Trucks. As in the case of passenger cars, output in 1923, 1925 and 1926 was somewhat above apparent needs.

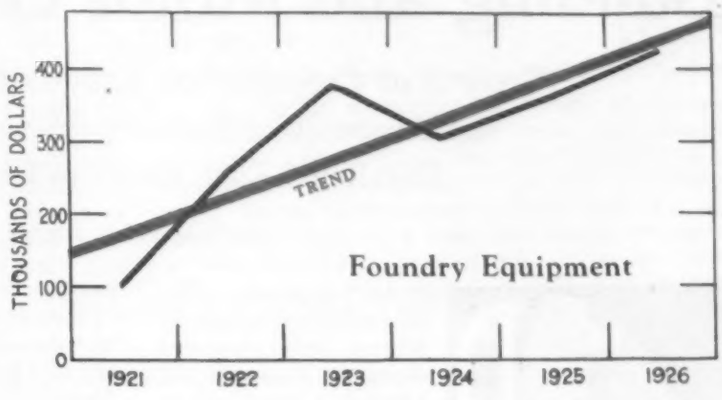
STEEL Sheets Have Found a Rapidly Increasing Use Over the Past Few Years. The trend line shows a gain of about 340,000 tons per year. The monthly average production of the last two years has been only slightly under 300,000 tons, compared with an average of about 150,000 tons in the three earliest years shown on the chart.

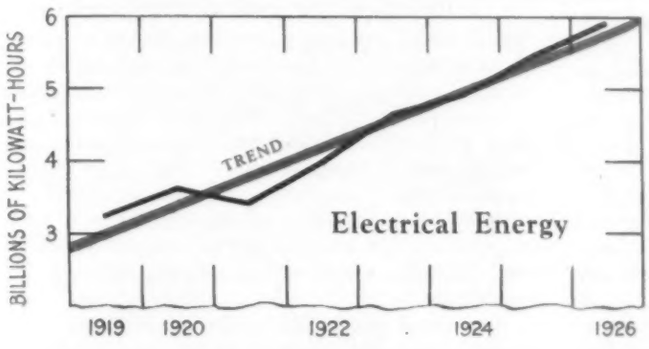


Foundry Equipment Business

SHIPMENTS of foundry equipment, expressed in dollars, have quadrupled since the low figures of 1921. The trend line shows a steady gain through which the total year's business increases by nearly $640,000.

Foundry equipment, on this basis, entered 1921 with about $147,000 of shipments per month. At the beginning of 1927 the figure had jumped to practically $465,000 per month. The increase was 217 per cent. Each month is about $53,000 higher than the same month of the preceding year. This indicates that each month should show about $4,400 more than the preceding month.





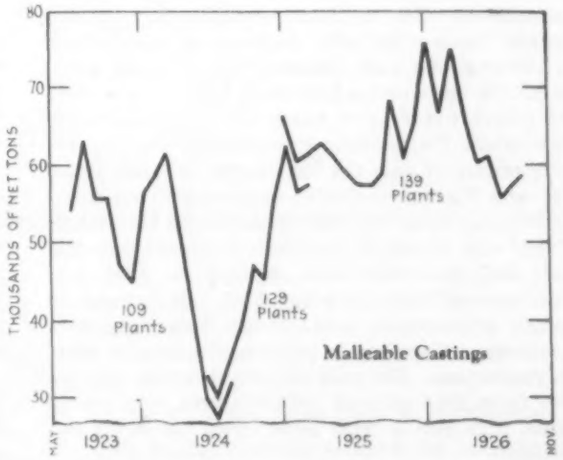
Demand for Electric Power

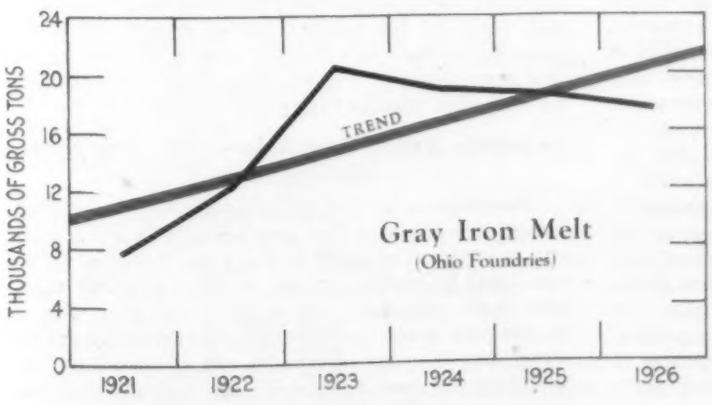
ELECTRICAL energy has grown rapidly since the war. Not only has it had to keep pace with increasing productiveness of industry, but also with the concurrent motorization of plants which long have used other methods of obtaining power. From an average of about 3439 millions of kwhr. per month in the first three years after the war, the present monthly send-out is approaching 6000 millions. The annual increase is about 4750 millions in the year's total.

Malleable Castings Production

PRODUCTION of malleable castings in the United States has been reported for some time on the basis of identical plants, month by month. It happens that returns to the Department of Commerce have shown occasional increases in the number of plants reported upon, which explains the breaks in our diagram.

No trend line has been plotted, in view of the inability to make direct comparisons over the whole period of time covered. Inspection of the curve would indicate a slight upgrade if a line were to be fitted to it, but production recently has been well below that of the early part of 1926 and most of 1925.





Gray Iron Melt

REPORTS from Ohio foundries showing the month by month melting of gray iron, have been available since the beginning of 1921. While the highest point was reached in 1923 and there has been a slow but steady drop since that time, the trend line shows an upgrade, due to the fact that the earlier years were far below the four most recent years. Based upon the figures reported, the trend line shown entered 1921 at about 10,200 tons per month and enters 1927 at nearly 21,700 tons per month. Its annual increment is at the rate of about 1900 tons per month.

Building and Motor Cars Compared

Growth of Construction Activity and Expansion of the Automobile Industry Have Very Closely Paralleled Each Other in Recent Years

BY THOMAS S. HOLDEN*

PRESENT prosperity of the country was attributed by William Green, president American Federation of Labor, in a recent address before the New York Building Congress, to the greatly increased activity of the construction industry. In the December issue of *World's Work* there appeared an article by Messrs. Foster and Catchings of the Pollak Foundation for Economic Research, which stated that expansion of the automobile industry was the key to our prosperity.

Some very good arguments can be marshalled to back both of these pronouncements. But I doubt if the iron and steel industry cares to listen to any debate on this subject. So long as construction activity and automobile production both continue at satisfactory rates, the iron and steel industry will be quite satisfied to fill the large orders that come from both of them and let others worry as to which one is entitled to the greatest credit for promoting prosperity.

As a matter of fact the big growth of construction activity and the unprecedented expansion of the automobile business have very closely paralleled each other, as is very well shown in the chart accompanying this article. Both industries went through the boom and deflation cycle of 1919, 1920 and 1921. Both began to show signs of revival in 1921, though these signs were more definite and obvious in construction than in automobile production. The rate of growth of the two industries from 1919 through 1926 has been very nearly the same, with just a trifle more speed for motor car production.

Both industries have created new wealth and have disbursed enormous sums in wages and purchases of materials. Even their seasonal fluctuations have shown a close resemblance. Each one of them has aided the development of the other. Increased production and sale of automobiles has not only called for construction of plant additions, garages, service stations, salesrooms, "hot-dog" stands and new highways, but it has helped to promote real estate and building developments on the outskirts of cities, in the suburbs and in the country, which would otherwise have had to wait for extension of transit facilities. On the other hand, the people who wanted to live in localities away from centers of congestion have been led to buy automobiles by that desire for less crowded living quarters. Undoubtedly the motor car business has found a large part of its patronage among people who have been engaged somehow in the construction business. Both industries will probably continue to profit mutually by each other's activities just as long as both are operating at a high rate.

Both of these industries have been greatly aided by the unusually strong financial condition of the country, and both have availed themselves extensively of special financing devices which have eased the flow of abundant funds into their respective fields of activity.

Dangers of Overproduction to Be Faced

THE rather striking parallelism in the post-war expansion of these two important supporters of our prosperity brings them today to a condition that both industries have to face. Both have greatly expanded their production facilities and have to guard against the dangers of overproduction. Both must gage their outputs rather carefully to consumer needs. Both must keep in mind that the market for new products (new cars and new buildings) is a market in which the used products (cars and buildings) make a strong competitive factor.

In certain phases the automobile business has progressed faster and further than the construction industry. Automobile production doubled between the years 1919 and 1923. Since 1923 the rate of growth has been satisfactory, but considerably slower than it was in the first five post-war years. Most people expect the automobile business to continue its growth at something near the present rate. The industry has become relatively stabilized since 1923. On the other hand construction did not double its 1919 volume until 1925. Its 1926 volume had an increase of just about 3 per cent over the previous year, compared with an estimated increase of 5 per cent in the volume of general business, and a probable increase of 7 per cent in automobile production. Its 1926 increase was made in the first two months of the year and maintained through the rest of the year in spite of a fairly strong declining tendency.

These facts make it appear reasonable to believe that construction entered a period of comparative stability in 1925, a period which extended through 1926 and appears to be going over into 1927. It is scarcely to be expected that the construction growth of 1919-1925 will continue indefinitely. Construction will continue to grow in volume with the increase in population and wealth of the country, but at some point it will begin to increase less rapidly than it did during the first seven years of post-war expansion. It looks as if we may have reached that point.

Automobile Makers Have Reduced Costs Faster Than Building Trade

Construction has not yet quite reached the strongly competitive condition that now prevails in the automotive industry. The latter industry has met competitive conditions by lowering prices, without reducing wages paid to its employees. It has been able to do this by maintaining quantity production and increasing the efficiency and economy of manufacturing operations. So far there has been some decline in building materials prices, accompanied by rising wages in the building trades. Material manufacturers have probably profited by the example of motor car manufacturers to the ex-

*Vice-president in Charge of Statistical Division F. W. Dodge Corporation, New York.

tent of cutting production costs through volume operations. But if competition becomes keener in the construction field the building industry may be called upon to make such improvements in design and the processes of erection as will reduce construction costs to the public.

Moderate Decline in Building Indicated for 1927

AS for 1927, the construction prospect indicated on the chart points to a moderate decline. It was stated above that the 1926 gain was all made in the early part of the year. Contracts have been declining moderately since March. Since June there has been a moderate falling off in the volume of planned work. The dominant classes of work that have gone ahead in the past five years, residential and commercial buildings, have certainly met all present necessity requirements. New buildings of these classes contracted for now must compete for tenants with an ample supply of existing buildings.

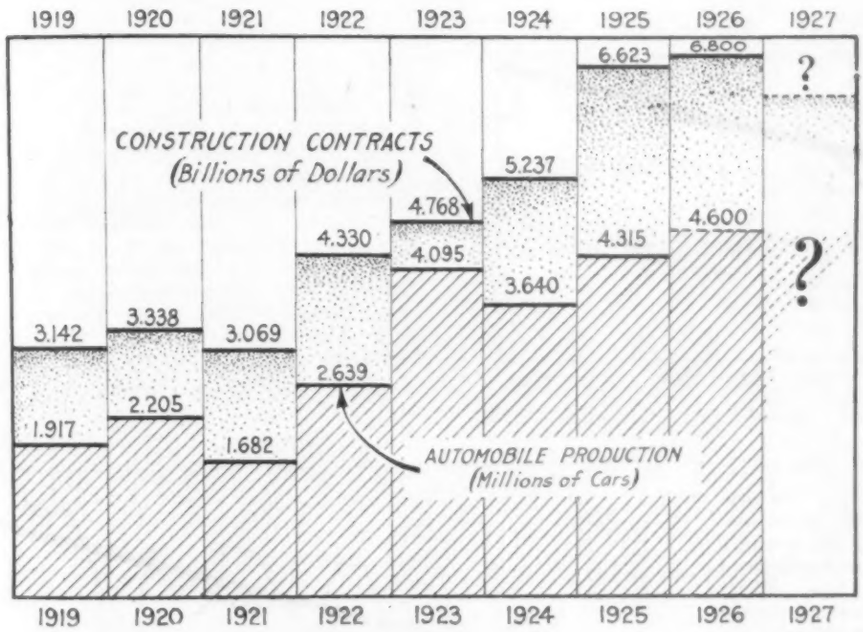
Stability was maintained in 1926, in the face of decline, by careful watchfulness of a number of important factors in the building situation. Credits of building operators were watched rather closely, there was a movement toward sound and uniform practice in appraising property on which bond issues are sold, and there was developed a tendency to rather careful scrutiny of community requirements before important contracts were let. Falling rents, the stock-market break in March, and the G. L. Miller & Co. receivership all served as warning signals which prompted a fair measure of caution.

Caution Essential to Maintenance of Stability in Construction Industry

A similar attitude of caution seems rather likely to prevail this year. Construction will be active and prosperous if it continues to maintain a policy of conservatism. It is highly desirable that the stability of the past two years be maintained. A big speculative boom in 1927 would be quite likely to bring on a reaction. The same reasons for progressing conservatively exist today that existed during the past year; they are even a little more potent now than they were a year ago. It is rather likely that the moderately downward tendency of contract-letting will persist at least through a portion of 1927. If it does continue through the first half, there may be a moderate upturn later, tending to stabilize the volume of operations through the year as was done in 1926.

Engineering Developments Are a Promising Prospect

The principal reason for the stability of contract-volume in 1926 was the fact that decreasing tendencies in contracts for buildings were offset by increases in contracts for heavy industrial and civil engineering work. Capital accumulations are very large now, and considerable volumes of investment money are apt to go into engineering developments of various kinds. These classes of work will be a little more likely to equal or exceed their 1926 volumes than other kinds of construction. If there is to be a decline, residential and commercial buildings would be the important classes that would show decreased volume. The classes of work that use large quantities of steel are rather likely to hold up better than the rest.



HOW the growth of the construction industry has paralleled that of the automobile industry since 1919 is shown in the chart, though economists attribute our present prosperity sometimes to the one and sometimes to the other industry.

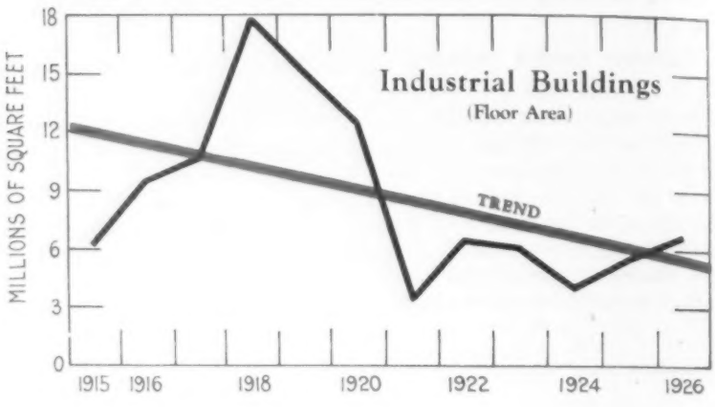
1927 May Bring Only Slight Reaction

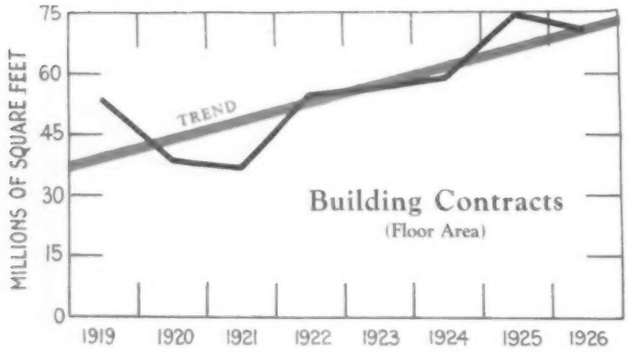
No drastic reaction seems to be in sight for 1927. Its contract volume will probably be fairly close to that of 1926. A decrease of half a billion dollars seems to allow a fair margin of safety in estimating the year's total volume at the present time. This would result in $6,300,000,000 worth of new construction, which may be considered as a minimum estimate in the light of present conditions.

A brief report of the annual convention of the American Institute of Steel Construction, held at the Greenbrier, White Sulphur Springs, W. Va., Oct. 26-30, has been issued in printed form. A letter from Secretary of Commerce Hoover, editorial comments and other communications regarding the meeting are also presented. Addresses and papers delivered at the convention are being printed and will be distributed later. The offices of the institute are at 285 Madison Avenue, New York. Charles F. Abbott is executive director.

Building Construction and Trends in

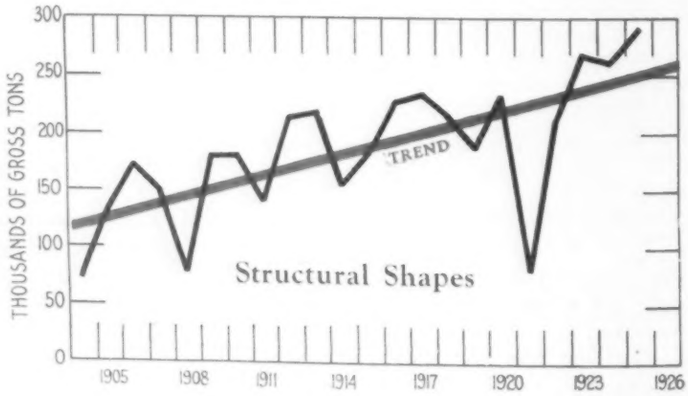
INDUSTRIAL building, unlike general building, has shown a sharp decline from the overproduction of the war period. In place of an average of 14,500,000 sq. ft. of floor area in 1917, 1918 and 1919, the average for the six most recent years has been only about 5,400,000 sq. ft. per month. The decline has been at the rate of some 7,000,000 sq. ft. per year.

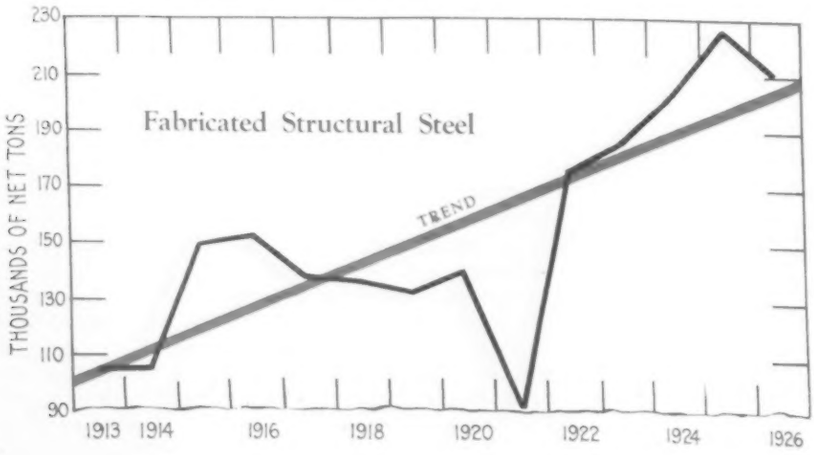




BUILDING contracts in the 37 northeastern States (about seven-eighths the entire building volume of the United States) have shown a steady increase since the war, as indicated by the trend line. The monthly average of the past two years has been above 73,000,000 sq. ft. of floor area, whereas the first three years after the war showed an average of only about 43,000,000 sq. ft. The increase has been at the rate of about 54,000,000 sq. ft. per year.

STRUCTURAL shapes are produced in about the same tonnage as steel sheets, the monthly average for 1925 having been a little under 300,000 tons. There has been a steady uptrend from the average of about 120,000 tons for the first five years on the diagram. The present gain is at the rate of 75,000 tons per year, or 2½ per cent of the total tonnage, against a rate of more than 4 per cent gain per year for the concrete bar tonnage.

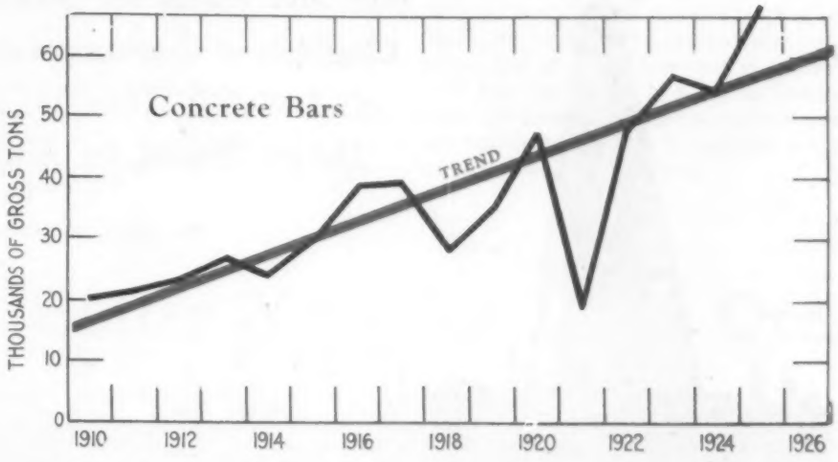


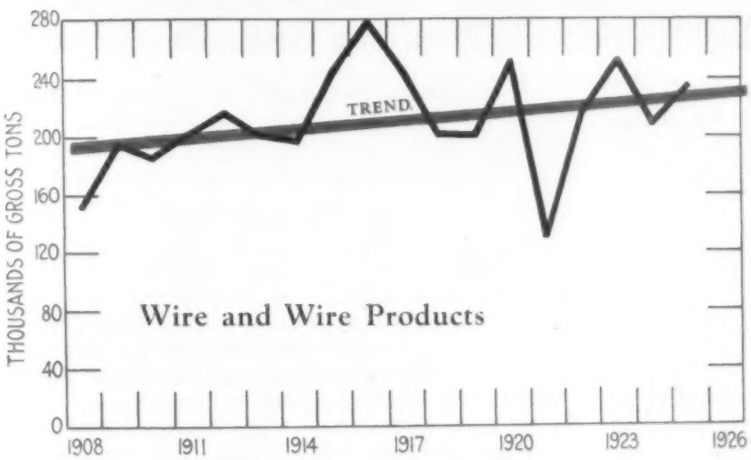


BOOKINGS of fabricated structural steel, collected by the Department of Commerce, have more than doubled in 14 years, as shown by the trend line. The average monthly bookings of 1913 and 1914 were about 105,000 tons, against an average of 218,000 tons in 1925 and 1926. The gain is something more than 90,000 tons annually.

Iron and Steel for Building Trade

PRODUCTION of concrete bars in the past 17 years has shown a steady increase, broken by an occasional bad year. The trend line shows virtual quadrupling of output. Average monthly production in the first three years shown is about 21,500 gross tons. Production for 1925, which is the latest for which figures are available, averaged over 68,000 tons per month. The annual increase in consumption appears to be 31,000 tons.

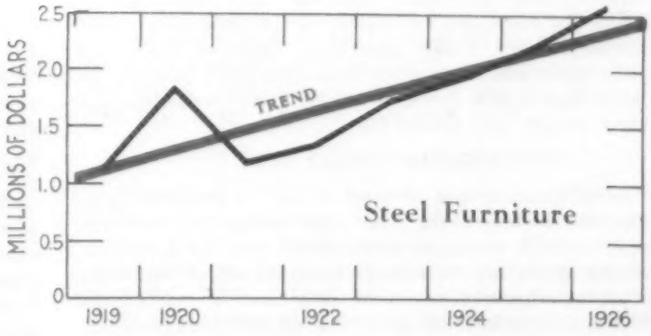


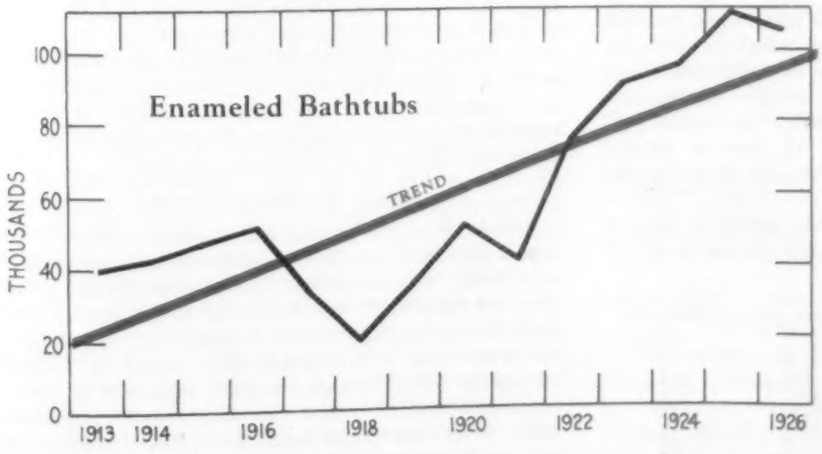


CONSUMPTION of wire and wire products, as measured by annual consumption of wire rods, has increased slowly over the past two decades. The trend line shows a gain of only 21 per cent in 19 years. The average monthly consumption appears to be 212,500 gross tons.

Only 1920 and 1923 of the post-war years show totals approaching the 1915, 1916 and 1917 aggregates caused by war needs. No other year in the record has come anywhere near equaling the volume produced in 1916.

SHIPMENTS of steel furniture are increasing rapidly. The average month of the past two years has shown approximately $2,400,000 of business, whereas the first four years in the diagram show an average of less than $1,400,000. Normal increase each year is at the rate of about $175,000 per month. The gain in eight years is 134 per cent.



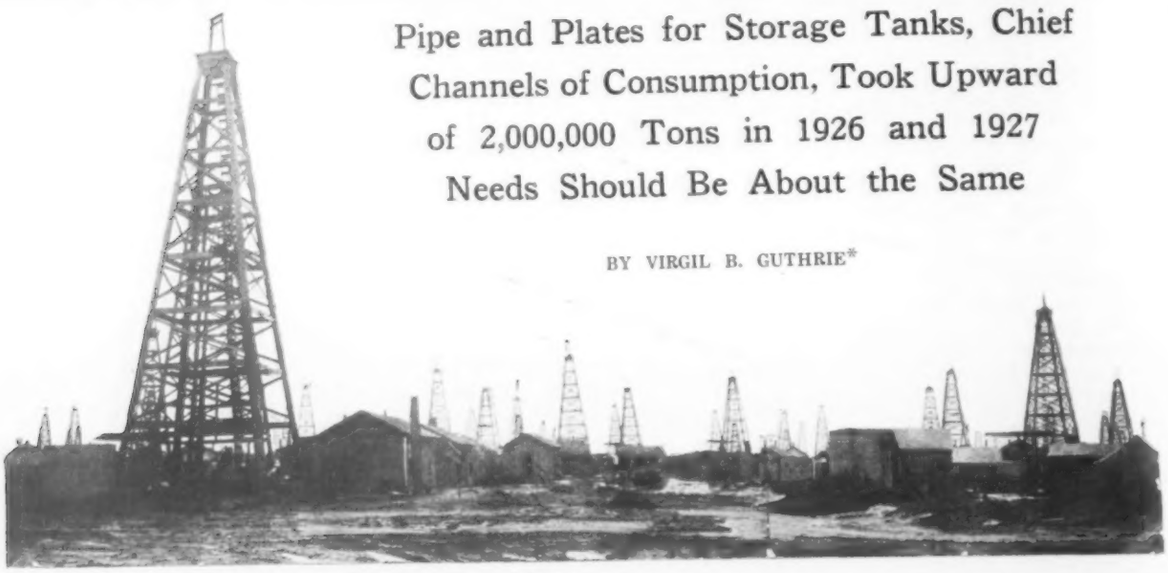


ENAMELED bathtubs shipped by the manufacturers show the evidence of the tremendous spurt in residential building during the past five years, and also the increasing demand for two and three tubs per house. The trend line, based on a 14-year survey, entered 1913 with about 19,750 bathtubs per month. It enters 1927 with a scant fraction below 100,000 bathtubs per month. This increase in 14 years was a little more than 405 per cent.

Steel Demands of Oil Industry

Pipe and Plates for Storage Tanks, Chief Channels of Consumption, Took Upward of 2,000,000 Tons in 1926 and 1927 Needs Should Be About the Same

BY VIRGIL B. GUTHRIE*



CONSUMPTION of steel in the oil industry in 1926, in the form of pipe and in plates for storage tanks, amounted to upward of 2,000,000 tons. While these two channels of consumption are by far the largest in this industry, there is a wide diversity of other uses in much smaller tonnage, including refinery equipment of various kinds, drilling and producing equipment, steel buildings and small storage tanks for refined products in the dealer's or consumer's hands.

Demand for steel from the oil industry should continue on about the same scale in 1927 as in 1926. Considerable thought is being given in the industry to the use of alloy steels of greater strength for particular purposes, such as withstanding high pressures and temperatures in refinery operation and resisting corrosion in refineries and some of the producing fields. Research work is well under way. However, the use of such materials, even when developed fully, will not be more than a few per cent of the total consumption of steel in pipe and plates for storage.

Pipe for Drilling Wells

The greatest use of steel in the oil industry is in pipe for drilling wells. The total tonnage for this purpose in 1926 is placed at 1,383,000 tons by a division of the American Petroleum Institute which has been studying standardization of this class of equipment. This estimate is based on a total of 24,000 wells drilled in 1926, averaging in depth from 1600 to 4000 ft. By this estimate these shallow wells of around 1600 ft. would average 25 tons of tubular steel to the well, while 4000 ft. average depth wells of California would take about 115 tons. These estimates take into account the sizes of casing and tubing used in the various producing districts. An average of 75 tons of tubular goods per well can be taken for all fields in the country.

The average tonnage in tubular goods in drilling wells in the principal oil producing districts is as follows, based on 1926 figures:

District	No. Wells	Average Depth, Ft.	Tons Pipe per Well, Ave.
Arkansas	1000	2500	33.5
Eastern States..	6700	2000	29.5
Texas	6000	2500	33
Rocky Mountains	650	3500	140
California	850	4000	115
Louisiana	900	1600	24
Kansas	1800	3000	111
Oklahoma	5000	3000	90
Miscellaneous ..	1100	3000	86

*Editor *National Petroleum News*, Cleveland.

It is estimated that pipe used on leases, but outside the well, such as water lines, fuel lines and oil lines, amounted to 69,000 tons in 1926. These, of course, are small diameter lines.

Pipe Line Consumption

Tubular goods going into oil pipe lines and gas lines, where they are virtually a part of oil company operations, have been estimated at 417,500 tons in 1926 for the active part of the country. This includes Texas, which has been particularly active in the Panhandle district in 1926, Oklahoma-Kansas, California and the oil producing districts east of the Mississippi.

In Texas the building of pipe lines to transport oil from the new fields in the Panhandle to railroad loading racks, and also three lines started to connect these fields with main trunk pipe line systems in Texas, called for 193,500 tons, according to this estimate. These lines would run in size from 8 in. for the great majority of the line laid to 16 in. for a relatively few miles of big gas lines. Gathering lines and other small lines laid in connection with these main pipe lines amounted to about 38,000 tons for Texas.

In California a much smaller amount of pipe line was laid in 1926, about 29,000 tons, 6000 tons of which was for smaller accessory lines of less than 4-in. pipe.

In the Eastern fields the pipe requirements for 1926 for lines, including gathering lines, were 93,500 tons, ranging in size from 4-in. to 10-in. with the exception of a few miles of large size gas lines.

In Oklahoma and Kansas, always an active territory so far as field development work is concerned, the pipe line requirements of last year are placed at 48,000 tons, running in sizes from 4-in. to 10-in., and 9500 tons for gathering lines of less than 4-in. size.

Crude Oil Storage Tanks

Steel plates for tanks for storing crude oil, on leases, pipe line tank farms and at refineries, amounted to 175,000 tons for 1926. This is considerably more than the tonnage of this item in 1925, the greater consumption in 1926 being due to the building of steel storage to take care of crude oil produced in the new Panhandle field of Texas, in California, and in Oklahoma principally. Unless new and equally important fields are opened up this year, the volume of steel going into crude storage tanks in 1927 will probably be less than in 1926.

In addition to this large size storage for crude oil, there is a considerable consumption of plates in small tanks used on leases, in petroleum products distributing plants, and gasoline service stations. It is impossible to approximate the volume of steel plates going into tanks for such uses.

Refinery Construction Requires Heavier Plates

Steel plates going into refinery construction work amounted roughly to 30,000 tons. This is somewhat larger than the figure for 1925 and it is almost certain, in view of the refinery expansion programs already announced, that more will be required in 1927. The tendency is definitely toward heavier plates and forgings in refinery construction, as the refining companies realize the value of a type of construction which will carry low maintenance charges. Present requirements of gasoline cracking plants demand heavier material also. The alloy steel going into refinery construction is placed now at 2 to 3 per cent of the total volume used, and this percentage is likely to increase.

Steel buildings are being more and more used in all branches of the business, but it is impossible to give an estimate as to the tonnage involved.

A Slightly Better Year for Lake Ores

Total Movement Around 60,000,000 Tons—Prices Give Little Incentive for New Development—Chicago District's Growing Share

INCREASED shipments with fuller operation of mines brought a slight lowering of costs, and thus the Lake Superior iron ore industry made a somewhat better showing last year than in 1925. Leading factors in ore production were unchanged from the previous year—prices, wages, rail and water transportation rates.

Little New Development

While further economies in production were introduced in some of the mines, including the more general use of mechanical methods or the substitution of more efficient equipment, the improvement shown in earnings statements is attributed for the most part to the greater volume. In 1925 many of the mining companies ended the year in red ink and last year not all of these got back into the profit-making list. Some mines producing low-grade ore did not operate during the year because the prices would not give them a profit.

Over-production has been one of the complaints of the Lake Superior ore industry for several years. While several mines were opened and some re-opened in 1926, leases of others were given up because the properties were well worked out or for other reasons, and it is believed that the balance may show a slight curtailment of aggregate productive capacity. The low earnings of the past few years have discouraged the putting of additional capital into development work and opening of new mines, and with the present ample capacity an early change in this situation is not likely. Production as a rule was kept down to shipments the past year and there was some reduction in stockpiles. The amount of ore at underground mines at the close of navigation is estimated to be considerably less than for several years on that date.

Eight Per Cent Gain Upon 1925

The consumption of Lake ore for the year ended Dec. 1 was 58,761,510 gross tons, according to figures compiled by the Lake Superior Iron Ore Association. This is a gain of 4,417,057 tons upon the preceding year when the figures were 54,344,463 tons. Lake shipments in 1926 for the year were 58,537,855 tons, or 8.24 per cent greater than the water movement of 1925, which was 54,081,298 tons. The 1926 total was exceeded in only four previous years, three of them in war time, the fourth being 1923. All-rail shipments last year, not yet tabulated, are estimated at slightly over 1,500,000 tons, making the total movement for the year a little in excess of 60,000,000 tons.

Ore reported on docks and furnace yards on Dec. 1 amounted to 42,760,964 tons, as compared with 41,685,888 tons on the same date in 1925, or a gain of 1,075,076 tons. Figures showing excess of shipments over consumption during the year vary a little from those showing the increase of ore on docks and at furnace yards Dec. 1, owing to a lack of uniformity in methods of making reports. However, the compilations show that the shipments for the year exceeded 12 months' consumption by slightly over 1,000,000 tons. More ore is now being consumed than at this time last year and if the present rate of blast furnace operation is kept up, ore stocks on docks and in furnace yards May 1 will be very little larger than on the same date last year.

With increased storage capacity at furnace yards and an ample supply of cars for handling ore from docks to furnaces, the tendency was to save handling and storage charges by taking more ore for direct shipment and putting less on docks. Consequently the dock balance of 7,662,800 tons on Dec. 1 was less than on that date in any previous year since 1907.

Nearly Two-Thirds from Mesabi Range

The gains in shipments last year over 1925 were rather evenly distributed as to ranges and grades, although there was some increase in the movement of manganiferous ore, as indicated by larger shipments from the Cuyuna range, which supplies the most of such ores. Shipments from the Menominee range also showed more than the average percentage in gain, indicating an increase in the demand for high-phosphorus ore, which comes largely from that range. Of the total shipments last year 64.97 per cent came from the Mesabi range. Shipments by water from the various ranges were as follows:

	Gross Tons	
	1926	1925
Vermilion Range	1,482,851	1,356,480
Mesabi Range	38,036,597	35,527,423
Cuyuna Range	1,861,483	1,400,648
Gogebic Range	7,140,081	6,664,501
Marquette Range	4,156,460	3,938,376
Menominee Range	5,860,721	5,193,870
Total	58,538,193	54,081,298

Growth of Chicago Consumption

The rather steady increase in the percentage of Lake ore consumption in the Chicago territory during the past few years is shown in the table below. The Chicago district receipts include shipments made to Chicago, Gary, and Indiana Harbor. The spurt in receipts in the Chicago territory in 1921 reflects the

policy of the Steel Corporation in not curtailing ore shipments to so great an extent as some of the independent consumers in lean years. Possibly the corporation did not speed up its shipments last year to the extent of some of the other consumers, which might explain the slight falling off in the 1926 percentage.

One of the developments in transportation the past year was the shipment of 122,000 tons of ore over a commercial dock in Chicago to a Granite City, Ill., consumer. Heretofore practically all ore for Granite City has been shipped over the all-rail route. The 1926 shipments to Granite City are included in the Chicago district total.

The consumption of Lake ore in the East has shown a rather steady decline for several years. Eastern furnaces took 8.41 per cent of the amount produced in 1918. Last year shipments to Eastern furnaces were only about 2.50 per cent of the total.

Prices Would Not Rise

Ore prices, which were named on March 17, were the same as for the two preceding years, a 50c. cut having been made in 1924. An effort was made to get prices up a little, some of the producers regarding the level established by early sales as too low; but keen competition resulted later in quite a little shading on standard grades of ore. The bases taken as established by the sales of March were as follows: Mesabi non-Bessemer, $4.25; old range non-Bessemer, $4.40; Mesabi Bessemer, $4.40; old range Bessemer, $4.55; high phosphorus, $4.15. These prices are for ores delivered at lower Lake ports.

Some Operating Changes

While there was some shifting in the control or ownership of mines during the year, there were no important transfers of developed mining properties to consuming interests, which has been the trend in recent years. Some of the changes in ownership or control of undeveloped properties during the year indicate that consuming interests are looking to the future and are picking up undeveloped properties having low grade ore that cannot be operated profitably for some time.

Oglebay, Norton & Co. within the year were appointed operating managers of the Youngstown mine near Crystal Falls, Mich., and will open up and develop this mine for the Oliver Mining Co., the lessee, from the workings of their adjoining Bristol mine. Oglebay, Norton & Co. have also been appointed operating managers and sales agents for the Feigh mine on the Cuyuna range, owned by the Northern Pacific Railroad, which is expected to ship 300,000 tons of ore a year. The operation of the mines of the Munro Iron Mining Co. in the Iron River district, owned by the Rogers-Brown Iron Co., was taken over by the M. A. Hanna Co. The Marquette Ore Co. gave up its lease of the Maroco mine on the Cuyuna range, which went back to the fee owners. The opening of one mine producing silicious ore that will take a large consumer and now part owner out of the market for that grade, the opening of another silicious mine and the re-opening of a third mine producing such ore are expected to make the supply of silicious ore much more plentiful this year than heretofore.

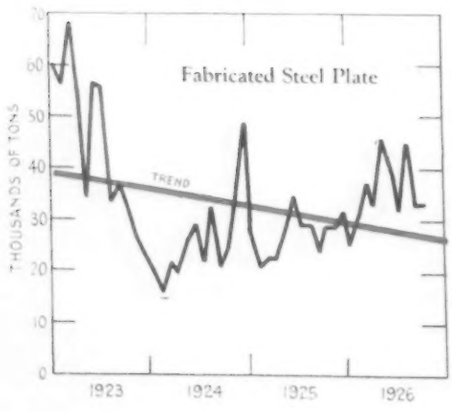
While the use of washed ore is increasing, little was done during the year in the way of providing additional plants for the employment of beneficiation processes, and no commercial developments are reported in the application of beneficiation methods for treating low grade reserves, although research work in that direction is being conducted by the ore producing States of the Lake Superior district.

The ore industry was free from transportation troubles during the year. The supply of cars was ample and the Lake fleet was not taxed to capacity to move all the ore shipped, although a rather late start was made in the opening of navigation. Neither was the industry beset with any labor troubles.

Receipts of Iron Ore in Chicago District

Year	Total All Ports, Gross Tons	Chicago District—Gross Tons	Chicago District—Per Cent of Grand Total
1913.....	48,668,525	8,394,037	17.25
1914.....	31,867,898	5,759,962	18.07
1915.....	46,298,661	7,307,126	15.78
1916.....	64,363,723	11,252,277	17.48
1917.....	61,924,876	11,813,948	19.08
1918.....	60,806,808	11,336,706	18.64
1919.....	46,872,791	8,330,075	17.77
1920.....	58,076,636	11,181,860	19.25
1921.....	22,107,787	5,785,172	26.17
1922.....	42,190,720	9,040,984	21.43
1923.....	58,430,483	12,613,277	21.60
1924.....	42,214,231	9,169,933	21.72
1925.....	53,540,318	13,210,086	24.67
1926.....	*57,797,687	*13,793,492	23.87

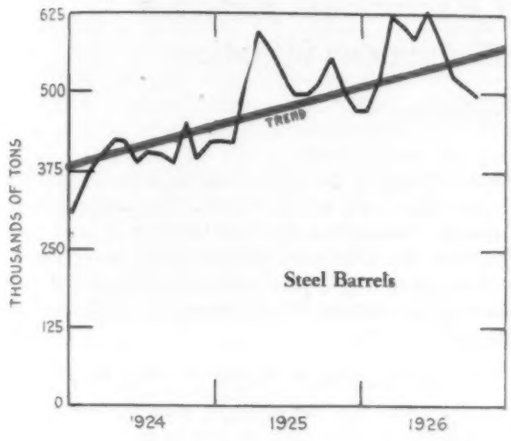
*Until Dec. 1.



Fabricated Steel Plate

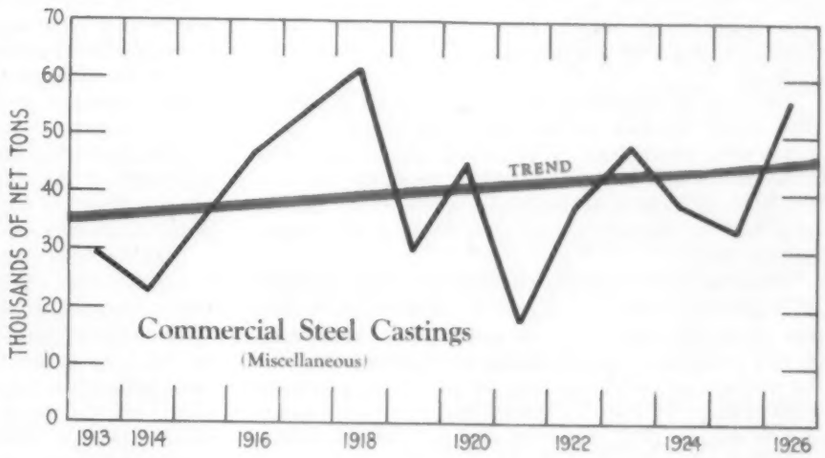
PRODUCTION of fabricated steel plate in the United States was much higher in the first half of 1923 than at any subsequent time. A trend line, therefore, based upon the last four years, which represent all the available data, shows a downward slope. Consideration of the curve as given indicates that, during the three most recent years, the natural slope is upward. On the basis of the four years, however, the trend entered 1923 at a little more than 39,000 tons per month, and enters 1927 at about 27,500 tons per month. The annual tonnage represents a decrement of 2900 tons per month. Because of the shortness of the period covered, the production line is plotted monthly rather than in annual averages on the monthly basis.

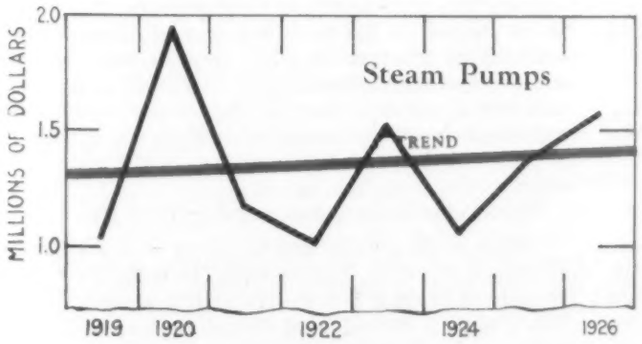
Consumption Trends of Some Industrial Items



STEEL barrel output in number of units has been available on a comprehensive scale for only a short time. Based on returns of three years, the slope is sharply upward, for the trend line entered 1924 at about 378,000 barrels per month and enters 1927 at about 583,000 units per month. The annual increment shows a gain of more than 68,000 units per month. The curve is plotted on monthly data, because of the shortness of the period covered.

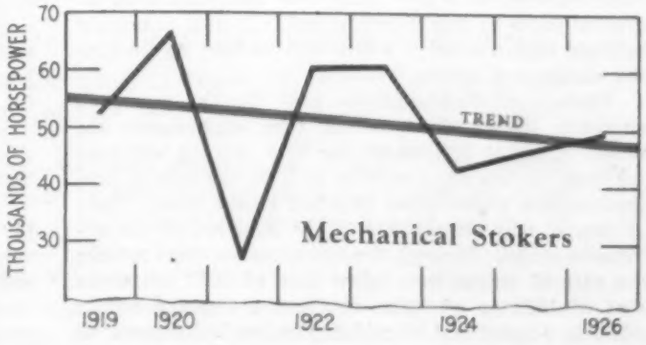
MISCELLANEOUS commercial steel castings show a rapid gain, entering the period with about 34,650 net tons per month and amounting at present to 45,400 tons, as expressed in the trend line. This gain figures out at 31 per cent, or somewhat higher than the percentage of gain of population in the United States. The monthly average output in the past five years has been approximately 43,700 tons. Consumption, according to the trend line, shows an increase of about 9300 tons a year.





STEAM pumps shipped by manufacturers are gaining slowly, with wide fluctuations in successive years. The annual increment is about $170,000 on a business which has shown recent averages of about $1,500,000 per month.

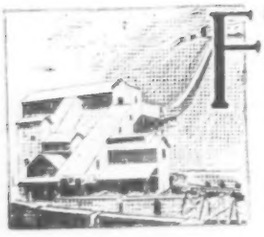
MECHANICAL stokers have shown a drop of some magnitude within the eight-year period studied. This may be attributed largely to two things—the increasing use of oil fuel and the increasing use of powdered coal. The average monthly horsepower of sales in the past three years has been about 46,000 against an average of 59,000 in the first two years shown.



Coal Trade Fortified for Strike

Wage Conference in February Will Find Operators Entrenched Behind Records of Exceptional Reserves of Fuel—A Review of the Bituminous Situation

BY A COAL TRADE AUTHORITY



FOR the bituminous coal industry, uncertainty marks the closing of 1926 and as surely hovers over the new year. After a boom in 1923, the industry was plunged early in 1924 into a period of relentless competition that for two years pushed many operating companies into bankruptcy, and others into the hands of the bankers. The competition was one sided because the famous Jacksonville scale tied the union fields to a fixed high wage scale, while the non-union fields dropped wages, and thus production costs, and took the business.

Twice in 12 months the artificial stimulus of strikes gave sharp upturns to the soft coal market. Both booms were short lived. Five months shutdown of the anthracite mines called for between one and two million tons of soft coal substitute each week, mostly lump coal, in the early months of 1926, and at satisfactory prices.

Likewise, the prolonged British coal strike touched off a glorious flare in this country in October. Prices rose from less than $2 to $5 and higher. Consumers in this country suddenly awoke to the fact that for the moment soft coal was hard to get and began large scale buying. For a few weeks the soft coal market was as wild as Wall Street in a panic, but the excitement soon abated.

Buyers here and abroad soon learned that were Europe's hunger for coal ten times what it was, the limit of our overseas coal exporting facilities is around 800,000 tons per week. From 11,000,000 tons per week the production of soft coal soared upward to 12,000,000, then to 13,000,000, and early in December to the dizzy height of 14,676,000 tons, a figure that had heretofore existed only in the calculations of statisticians.

Increased Export Trade Brought Wage Increases

Wage increases were made at all non-union mines around Nov. 1, and coal diggers became plentiful. The high prices of October justified high wages, but when prices began to decline before the month of November was half over, some operators repented their generosity. Wage cuts back to previous levels have already been reported in a few fields, but there has been no general move in this direction and it is now commonly believed that non-union wages will be kept up through the winter and spring.

Production of bituminous coal for the year will approach 580,000,000 tons and thus approximate the record figure of 579,000,000 for 1918, the big war year for coal. In the early months of 1926 the rate of production was higher than in other recent years. This, of course, was largely due to the influence of the anthracite strike. Through the spring and summer months the rate of output was below that of 1923 but above that of 1924 or of 1925. Production began a steady climb in August and by mid-September had crossed all previous records for the season and the highest weekly record for all time was attained with 14,676,000 tons in the first week of December. The remarkable thing about the history of the last quarter is that in excess of 12,000,000 tons were poured forth week after week with practically no complaints of railroad car shortage. Seasonable weather aided the railroads in this wonderful performance.

Strike Talk a Factor in 1927 Outlook

Of course, the big question now is, What of 1927? Everything depends on (1) stocks in the hand of consumers as of Jan. 1 and as of April 1, 1927; (2) intensity of industrial activity the first half of the coming year; (3) the firmness of the United Mine Workers in their avowed determination to maintain the Jacksonville scale of wages; (4) and, finally, the fortitude of union operators in the effort circumstances forecast they will make to reduce the union scale. One should add the somewhat uncertain factor of governmental interference if the union calls a strike. Washington is already rumbling with political talk about "doing something" to save the country from such an event.

Taking these points up in order, from present data it appears that the country has opened the new year with around 67,000,000 tons of bituminous coal in consumers' stock piles. The figure stood at 44,000,000 tons on Oct. 1, by governmental estimate. At least 5,000,000 tons, probably more, of October output rested in stock piles. Of the nearly 60,000,000 tons produced in November, close to 12,000,000 tons were stocked. For December it is reasonable to estimate a production of 50,000,000 tons, of which 6,000,000 tons will go into reserves. This gives a total of 67,000,000 tons of reserves above ground, a figure exceeding any recorded and probably as great as on April 1, 1922, estimates for which ranged from 60,000,000 to 70,000,000 tons. It is only fair to say that some very competent observers do not concur in this estimate, but hold that consumption is higher than ever before and that stocks are not so large.

Large Reserve Stocks Being Built Up

Whether the country will be happy with a coal pile of around 70,000,000 tons on which to make New Year resolutions or not it is too early, at this writing, to say. But if more is desired, even though not required, there will remain three months, January, February and March, in which to pile up more millions of tons, before a strike can be called. Thirty million tons could easily be produced for storage in the first quarter of the year, and 100,000,000 tons be available to weather out a prolonged strike. Such a reserve would carry this country for two and a half months of winter weather.

The bearing of all this on 1927 is that the bigger the stock pile the softer the market price of coal, even between now and April 1, 1927.

As a matter of fact, demand for tonnage has fallen off over the holidays and may remain at a reduced volume until the country at large takes stock of affairs and finds how general industrial activity lines up for the first quarter. The coal that has gone into reserves recently is not bargain counter stuff, for it averages the buyers 50c to $1 per ton higher than it could have been

had for last summer. Furthermore, it will be possible to replace it in February and March at figures below November quotations.

Coal Conference to Take Place in February

Before this is published the United Mine Workers will have had their election. John L. Lewis will have been reelected, for his only opponent is stamped as a radical and it does not seem possible that Brophy can muster a real vote, despite the widespread dissatisfaction in the ranks of the union. Then comes the joint meeting with the union operators representing the four competitive States, Illinois, Indiana, Ohio and western Pennsylvania, scheduled at Miami for early in February. There the union is expected to stand firm for a renewal of the contract with no changes in wages. As three years ago, the only question on which the union will debate will be the term of years for which the scale is to be renewed.

Estimated Division Between Union and Non-Union Bituminous Coal Production per Week, Based on Production Reported by Bureau of Mines for Week Ended Nov. 20, 1926

State	Non-Union	Union
Alabama	524,000	.....
Arkansas	30,000	24,000
Colorado	257,000	.....
Illinois	.....	2,046,000
Indiana	.....	680,000
Iowa	.....	149,000
Kansas	.....	128,000
Kentucky—East	993,000	.....
Kentucky—West	398,000	.....
Maryland	84,000	.....
Michigan	.....	22,000
Missouri	.....	78,000
Montana	.....	77,000
New Mexico	69,000	.....
North Dakota	.....	36,000
Ohio	.....	816,000
Oklahoma	30,000	31,000
Pennsylvania	2,000,000	1,742,000
Tennessee	134,000	.....
Texas	15,000	14,000
Utah	103,000	.....
Virginia	302,000	.....
Washington	60,000	6,000
West Virginia	3,240,000	.....
Wyoming	.....	192,000
Total	8,239,000	6,041,000

Will the operators sign? Most say No! Why should they sign? With a strike heavily discounted by abnormal coal reserves, announcement of a settlement at Miami prior to April 1 would knock the last pin from under the coal market. It would be next to impossible to sell coal save at prices so low none but the non-union operators with drastic wage cuts could meet them. The country held a 67,000,000-ton coal stock pile over the heads of the industry when they met in Jacksonville in February, 1924. Political pressure sealed the wage contract, but nothing upheld the market. It required 17 months or until June 1, 1925, to work that pile down to 38,000,000 tons, a reasonable figure for midsummer.

Furthermore, there is a lot more non-union mine capacity now than in 1922 or 1924. When the strike of 1922 had been under way for two months, non-union output reached its maximum of 6,000,000 tons a week. In the table in the adjacent column is a guess as to what is union and non-union today.

More than 8,250,000 tons a week, or in excess of 80 per cent of the peak requirements of the country and as much as normal consumption, exclusive of exports and summer shipments of Lake cargo coal, is what the non-union mines are producing today.

Struggle Over Wages Seems Inevitable

No one doubts the firmness of Mr. Lewis in his policy of maintaining the high wage scale. His policy has too often been publicly declared to permit any backward step. Nor can one well doubt the practical necessity of union operators, notably in Ohio and Pennsylvania, seeking lower wages and lower operating costs. When these two parties get together in February at Miami to talk of a new wage contract, the operators will point to the large stock of coal already mined, the prostration of the soft coal market, the overwhelming mine capacity of the non-union fields and the futility of the three-year struggle with bankruptcy during the life of the Jacksonville scale. They are going to ask Mr. Lewis where he is leading them, those who stay with him, in part by choice but mainly of necessity.

The union representatives will point to the boom prices of October and November, even to the assistance given the soft coal market by the anthracite strike of 1925-1926, and argue that the coal producer can get good prices if he will and that he should continue to pay high wages because high prices for coal justify them.

No Threat to Coal Consumer

What some one will have to take into consideration is how long will it take the country to burn up the stock pile, using currently up to 8,000,000 tons a week of non-union production. What chance has a strike under such conditions? And then others may speculate as to what will happen in the non-union fields if the union calls a general strike—calling on *all* union men, wherever employed, to walk out. Admittedly the non-union mines in northern West Virginia and in central as well as western Pennsylvania have a goodly number of former union men at work. Non-union production after April 1 would be reduced in proportion as such men respond to a strike call.

Such are some of the more important problems that face the soft coal industry in 1927. It will be observed that however serious these problems may be to the coal operator and the labor union official, they contain no real threat for the coal consumer.

Will There Be a Soft Coal Strike? If So, What Will Be Its Effects?

These are questions uppermost in the minds of those who regard the threat of a bituminous miners' strike as the most serious labor and industrial situation that 1927 will bring.

This analysis of the outlook shows that coal reserves as of Jan. 1 were about 70,000,000 tons, and that this could easily be increased to 100,000,000 tons by April 1, when the strike may occur. This is enough coal for two and a half months of winter weather.

With the unions probably standing firm for a renewal of wage contracts, the operators undoubtedly will insist on a wage reduction. Meanwhile, the coal consumer, fortified with ample stocks, may view the situation without alarm.

High Capacity

REFERENCE was made on page 984 of the Oct. 7 issue of THE IRON AGE to a paper by Major R. A. Bull, read before the American Foundrymen's Association at Detroit. Major Bull showed a present steel foundry capacity in the United States of 2,622,000 tons of castings annually. As the 1925 production was but 1,252,786 tons, it represented only 47.8 per cent of capacity. Even the record output of 1,458,031 tons, in 1923, was only 55.6 per cent of 1926 capacity.

Putting three of Major Bull's tables into one, we have Table I showing the capacity, the 1925 production and the percentage of capacity represented by production for the five leading types of casting plants — acid open-hearth, basic open-hearth, electric, converter and crucible. With the exception of the converter plants, there was considerable uniformity in the use of such capacity as existed, the various types ranging from 47.1 to 50.1 per cent of use. Production of the converter plants, however, was only 36.2 per cent of capacity.

It may be noted that, with the exception of the converter plants, the lowest position was held by electric furnaces, in which 47.1 per cent of capacity showed up in the product. This record is in spite of the fact that the production of electric castings was far higher in 1925 than in any preceding year, and that it was more than 12 times the record of only 10 years before. As a matter of fact, electric castings in 1925 represented more than 22 per cent of all steel castings, whereas, prior to 1914, they represented less than 1 per cent, and never reached 10 per cent until 1919.

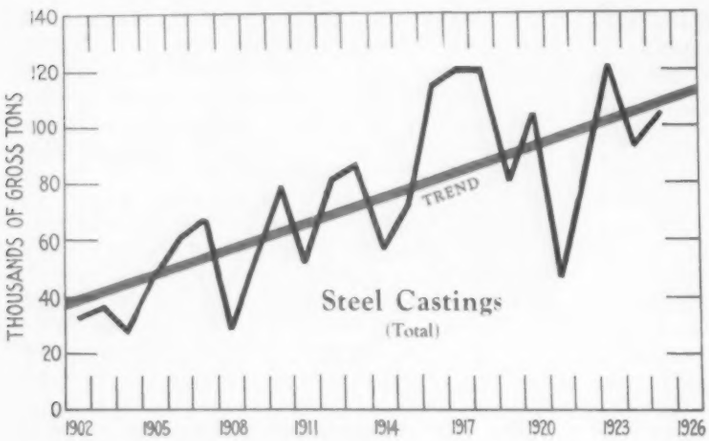
Steel castings made from Bessemer converters amounted in 1924 and 1925 to only one-third the aggregate of 1917 and 1918. Those years of high production showed an output greater than the present rated capacity of converter plants in steel foundries. The two latest years provided lower outputs of this type of casting than were made in 1911 and 1912. Only in 1921 and 1922 of the past 15 years have smaller tonnages been made.

Table I.—Steel Castings in the United States

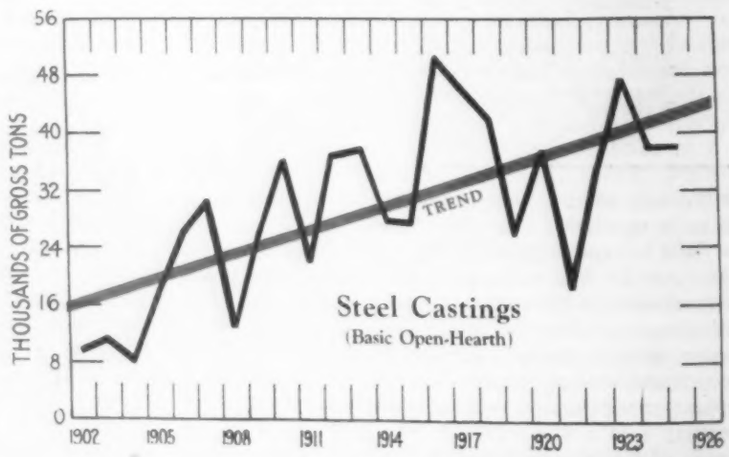
Class	Capacity	1925 Production	Per Cent
Acid Open-Hearth..	939,607	462,303	49.2
Basic Open-Hearth.	909,385	455,282	50.1
Total Open-Hearth	1,848,992	917,585	49.6
Electric	593,541	279,534	47.1
Converter	148,550	53,834	36.2
Crucible	3,730	1,833	49.1
Unclassified	27,500	.....	...
Total	2,622,313	1,252,786	47.8

Six diagrams show the history of production of steel castings over the past quarter-century. There is one diagram for each of the five kinds of steel castings and one for the total. Each of these diagrams carries a straight line which has been determined mathematically as the trend line, based upon the recorded production year by year over the period studied. Such great advance has been made in electric castings, however, that it was found impossible to fit a satisfactory straight line to the entire period covered. In this case the period begins with 1915, where the others begin with 1902.

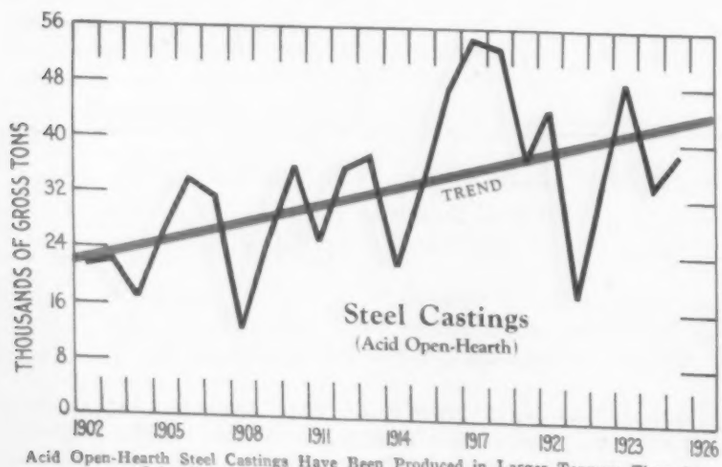
Taking up these trend lines in order, we find that production of all steel castings was, on the trend basis, at the rate of 36,307 gross tons per month on Jan. 1, 1902, and at the rate of 114,782 tons on Jan. 1, 1927. This



Steel Castings Over the Past Quarter-Century Have Trebled in Monthly Total. Present increase is at the rate of nearly 38,000 tons annually



Basic Open-Hearth Castings Have Grown from an Average of 9600 Tons Monthly in 1902, 1903 and 1904 to 41,000 Tons per Month in 1923, 1924 and 1925



Acid Open-Hearth Steel Castings Have Been Produced in Larger Tonnage Than Any Other Type. The trend line shows a doubling in 25 years

in Steel Castings

shows a normal increase in monthly production amounting to 3139 tons each year—that is, the monthly rate, Jan. 1, 1927, is 3139 tons higher than that of Jan. 1, 1926.

Specific Classes of Castings

Acid open-hearth steel castings have been increasing at a slower rate than the total steel castings. Instead of multiplying by three over the quarter-century period, the acid steel castings have doubled. In this case the gain has been from a rate of 22,326 tons per month on Jan. 1, 1902, to 44,395 tons on Jan. 1, 1927. The annual increase in monthly production is shown to be 883 tons.

Basic open-hearth steel castings have just about kept pace with the rate of growth of all steel castings, having virtually trebled in the quarter-century. Here the gain has been from 15,407 tons per month at the beginning of 1902 to 44,982 tons per month at the beginning of 1927. The annual increase is 1183 tons in the monthly production.

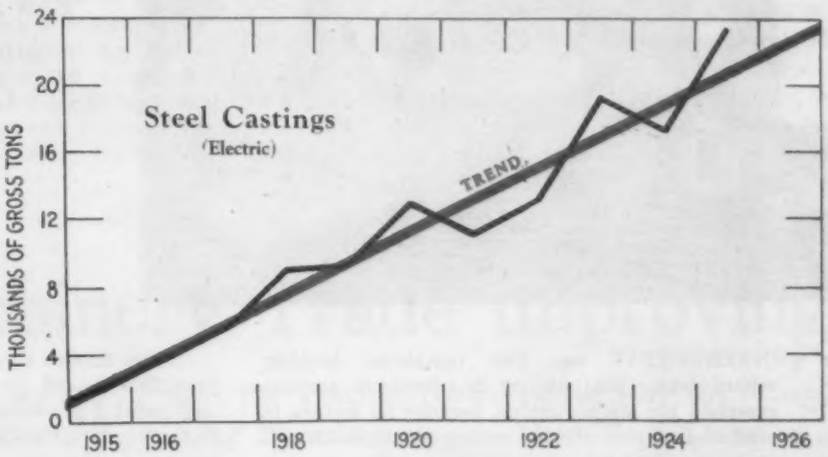
Bessemer (converter) steel castings, while showing a heavy gain over the period as a whole, have recorded a sharp slump since the war, being now at a rate only one-third as great as that of 1917 and 1918. Considered over the entire period, however, Bessemer castings have quadrupled in tonnage, having advanced from 2159 tons per month at the start of 1902 to 8794 tons at the start of 1927. About 265 tons per month represents the annual increase.

Crucible and miscellaneous steel castings, on the other hand, have shown a steady decline. If the present rate of decline continues for only a short time longer, this type of casting will be an extinct species. The trend line starts at 1691 tons per month on Jan. 1, 1902, and drops to 87 tons per month on Jan. 1, 1927. The decrease has been at the annual rate of 64 tons per month.

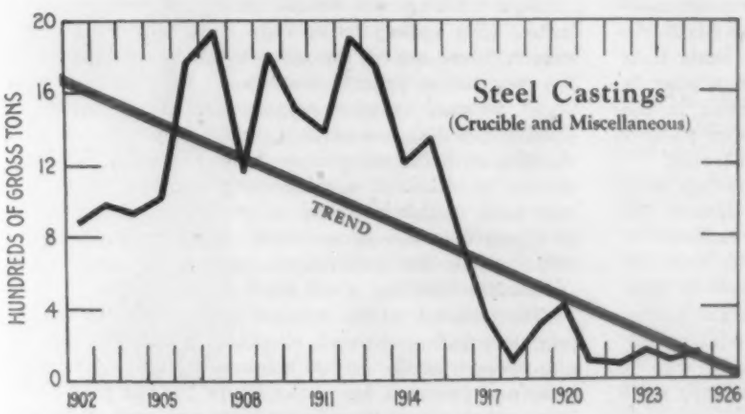
Electric steel castings over the last twelve years have followed consistently a trend line beginning with about 1000 tons per month on Jan. 1, 1915, and appearing as 23,616 tons per month on Jan. 1, 1927. If electric steel castings were to be plotted for trend line from 1909, which is the earliest date for which figures are available, the trend would have to take the form of a curve, with a sharply ascending curvature.

Inasmuch as pressed sheet or strip parts have been making such heavy inroads into the castings industry in the past few years, a plotting on this basis might show unduly optimistic future prospects, even for an industry which has grown so rapidly as that of electric steel castings. Hence, it was considered better to show the trend line as a straight line over a shorter period of time—one which it fits adequately and which, for those desiring to explore the matter further into the background, can be joined to a similar straight line at a lower slope and covering the earlier years.

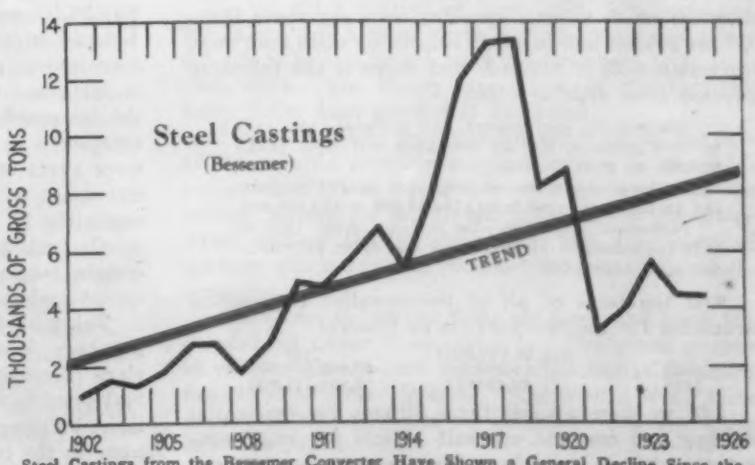
Estimating population at 116,000,000 in 1926, the consumption of steel castings works out at a little more than 25 lb. per capita. As population increases per capita consumption may increase with it. Tentative figures may be worked out on the assumption that this will be the case.



Production of Electric Steel Castings Has Grown by Leaps and Bounds. The level of the trend line is now approximately 10 times that of 10 years ago



Steel Castings Made in Crucibles and by Miscellaneous Processes Have Practically Disappeared, Since the Large Production of the 10 Years Preceding the War



Steel Castings from the Bessemer Converter Have Shown a General Decline Since the War, but the Trend Line Over a Quarter-Century Is Strongly Upward

Bridge to Span Hudson River at 177th Street, New York

Construction in 1926 and 1927

Year's Gain in Building Operations Reflects Public Confidence in Maintained Prosperity

BY FRANK C. WIGHT*

CONSTRUCTION has just completed another record year. Statistics in this industry are not complete nor authoritative, because its nature is so diverse and sources of information are so scattered. The exact sums put into construction each year cannot be recorded, or even guessed at, with the approach to accuracy of the figures in iron or wheat production. There are comparable bases from year to year, however, and the relative progress in any one year is fairly measured by these comparisons. On this basis it is estimated that assuming 1925 to have been a year in which $7,000,000,000 was put into construction in the United States, the 1926 figures would be about $7,500,000,000, in other words about a 7 per cent increase.

This means that in the past year the obvious general prosperity was reflected by a continued demand for new construction. But it means too that the expectation by the business world for continued prosperity was also reflected, for construction is a double measure of general business conditions, in that he who has made money tends to turn some of that back into new housing for himself and his plant, while the manufacturer who is looking ahead to increased business is in his turn adding to his plant capacity.

An analysis of the 1926 figures shows that all classes of construction are ahead of the year before. Thus we find for large engineering construction, that is construction which roughly speaking costs say above $100,000 per project and to which something more than mere craftsman skill is devoted, that there is the following increase from 1925 to 1926:

Waterworks and sewers—An increase from 1148 to 1356 projects, and an increased cost from $154,000,000 to $166,000,000.

Bridges—An increase from 427 to 468 projects and an increased cost from $70,000,000 to $85,000,000.

Industrial buildings—An increase from 1271 to 1476 projects and an increased cost from $228,000,000 to $318,000,000.

And the total of all of the so-called engineering structures for the two years is as follows:

	No. of Projects	Cost
1925.....	9,243	$2,600,000,000
1926.....	10,836	2,854,772,000

Add to these around three billions for residential building and one and one-half billions for small construction below that classed as engineering and the grand total is arrived at.

These figures showed no sign of decreasing as the year 1926 neared its end, but one class, which receives considerable prominence in the public eye, did begin to fall off and this falling off has led to some misconception as to the present status, and the future, of the construction industry. There was a reduction in 1926 from 1925 in the total of residential buildings.

Now buildings are not all there is of construction—indeed they appear to be only about one-third of all construction—nor by the same token do they use all of the various structural materials. The term "buildings," as used in most construction statistics, means housing buildings—residences, apartments, hotels and the like, with the other commercial and office buildings that go in cities. There has been a falling off, as has been said, in this class but so far as the statistics can be interpreted this is mainly in small residential construction, in the hotels and apartments, *and in the speculative building of all sorts in the larger cities.*

The tendency of the past six months in these classes may, it is to be supposed, be taken as an indication of an approach to the end of the housing and speculative boom and promises less expenditure for the year 1927. In no other class of work, however, are such signs apparent.

The Promise as to Continued Activity

PUBLIC works construction, that is streets, roads, water supply, sewers and sewage purification plants, continued at a high rate. Power production keeps increasing and the railroad construction demands reflect the increased properity of most American roads. Irrigation is in the doldrums, but it has been there for some years and there is no immediate prospect of its emerging, so construction from that source will be negligible in the grand total. Harbors, rivers and canals continue to make demands on construction, and certain major projects in this class bid fair to make exceptional demands soon, though probably not in 1927.

Taken all in all, and making the usual apologies for prophecy, it would seem that 1927 will show no great signs of reduction in construction. Certainly the only real cloud in the sky is the over-development of speculative building in the large cities. That apparently has come to the turning point. Some of the financing interests have become overextended in this direction, and the continuance of the movement from existing satisfactory, though not altogether modern, quarters to

*Editor, *Engineering News-Record.*

hastily built and daringly financed buildings show signs of reduction, in apartment houses as well as office buildings and small manufacturing occupancies. This class is probably only about 20 per cent of total construction, so that its falling off cannot seriously affect the general total of construction. All other classes are firm in their increases and have not pyramided to a degree that warrants any expectation of overtoppling.

Prospects as to Construction Costs

WAGES in the building trades continue high, probably the highest of any class of labor. There has been no pronounced movement in such wages during the past year, nor is any movement either up or down to be expected, unless there is first a causative pronounced change in building demand. Building labor is well organized in most of our cities, and it is undermanned, so that the law of supply and demand operates to keep wages high fully as much as do the union rules. There is an undercurrent of resentment by the building employers at the high rate of wage they have to pay but so long as building volume keeps high nothing is likely to happen in employer-employee relations. Just the moment demand falls off we may expect a decided movement toward wage reduction which will precipitate an open struggle.

Materials prices are falling in general, though not to a degree to affect building costs. The *Engineering News-Record* Construction Cost Index, a measure of general construction cost based on a balanced amount of representative materials and the average of common labor, was 207 for 1925 (base 100 is for year 1913), and 208 for 1926.

Construction, therefore, is not breeding in itself any dangers for the immediate future. As a cause for future conditions any view of it must be optimistic. As an effect, that is, as one of the visible manifestations of general business wealth, its future is obviously tied up to general business conditions which it is not the province of this brief article to discuss.

Farm Machinery Trade Improving

Motorization of Agriculture, Begun with the Tractor, Now Followed by the "Combine," May Revolutionize Equipment Manufacturing in Next Few Years

BY GEORGE F. MASSEY*

STANDING in a far stronger position today than at any time since the spring of 1920, the farm machinery and equipment industry looks forward to a still further gain in business during the first four months of 1927. Gas tractors are well in the lead among the equipment items which are selling well, but the improvement of the past year has extended to all lines. Weather, as always, will be a modifying factor as regards 1927 business, and exception must be made as regards those territories where cotton is the prevailing crop.

To appreciate the present upturn in farm equipment it is necessary to understand, at least in outline, the history of the trade for the six-year period now closing. In the fall of 1920 the farmer, because of the sudden drop of prices for his products, abruptly left the implement market. He was in a huff and remained that way fully three years. That his mood was easily understandable did not make it any the less damaging to the farm equipment industry.

No Nebraska cyclone ever did more to a frail henhouse than the farmer's resentment did to this substantial old trade that had served him so well and so long. Volume dropped to something like 25 per cent of normal. The bread line, or its equivalent, appeared at one of the principal plow manufacturing centers.

Companies failed and grazed failure. Sales organizations were disrupted. An industry which for half a century had believed itself impregnable, indispensable, was cut off from everything remotely resembling profitable patronage. When the farmer needed another field tool he patched, borrowed or bought an old one.

Improvement Began in 1924

This went on until 1924, when the implement industry ventured out of the cyclone cellar. The gale had died down, though customers in most parts of the country were rare. Still, there were some customers. The following year was a good deal better. Its "percentages" of increase showed up well, since comparison had to be made with such sorry figures. With volume restored to something like normal in the fore part of 1926 the percentages began to take on real meaning.

Full-line business—that spread over all units of farm equipment—increased from 40 to more than 60 per cent as shown in fall-written contracts for goods to be delivered early in 1927. This is particularly true of trade in the lower Missouri and upper Arkansas valleys. It is not so true of the northern part of the corn belt where weather conditions have been adverse.

In the dairy regions of New York, Wisconsin and Minnesota, the tide of farm equipment volume never did fall to so low an ebb as it did elsewhere from 1920 until 1924. The steady circulation of the farmer's dairy dollar kept his pocket furnished.

Two outstanding developments are plain on the face of the returns covering recent progress in the modernization of farm equipment: First, the rise of the tractor; second, the rapidly increasing use in the winter wheat belt of the "combine," the big, tractor-pulled machine which cuts and threshes the grain at a single operation.

Out where the wheat fields are large and level, the demand for power is spontaneous. The wheat grower of western Kansas and regions adjoining is definitely committed to power farming. The tractor is as much a part of his equipment as the motor delivery truck is of the city florist's.

No tractor manufacturer is more enthusiastic over power farming than this same farmer. Consequently

*Editor *Implement and Hardware Trade Journal*, Kansas City, Mo.

he is keen on maintaining and replenishing his motorized equipment. Essentially this man is as modern in his outlook as a Wall Street broker.

So far as the combine is concerned, it is literally working a revolution in the winter wheat harvest. Until several years ago the wheat belt swarmed with itinerant harvest hands who followed the grain north as it ripened for cutting. But their numbers have dwindled.

Combine Is Farm's Most Expensive Machine

When a machinery dealer sells a combine it is a good deal like selling a bungalow, for the price to the farmer in the ordinary case exceeds $2,000 and the machine is the largest unit of farm equipment that has yet put in its appearance.

Just how far the use of the combine will extend eastward is still under debate. Until recently most men in the trade had thought it would be confined largely to the western part of the watershed drained by the Missouri, Arkansas and Red Rivers, and to its original "habitat" beyond the Rockies.

In those territories where so-called semi-arid conditions hold sway the combine was supposed to be peculiarly adaptable, but not elsewhere. Nevertheless this huge, labor-saving machine tends to break out of bounds and go East. Already it is used in Illinois and Indiana for harvesting soy beans. And in the moister regions where wheat is raised on a large scale, methods have been tried out with the combine that promise to develop.

Becoming an Increasing Factor in Agriculture

Certainly, wherever the wheat ripens uniformly with a minimum of moisture content the combine is driving out headers and threshers, machines that were formerly as staple in the Great Plains as the binder is in other small-grain-growing regions.

Whatever is to develop from the combine, whether it will so reduce the cost of small grain production that non-users can no longer compete, or whether it simply spreads over the territories where it is now both popular and successful, this machine is sure to become an increasing factor in agriculture.

One other highly significant thing is to be noted: The development of a tractor calculated to cultivate row crops. The early tractors at the beginning of this century were heavy and clumsy contraptions. One man called them "iron mines on wheels." Gradually they were refined and made nimble. They were used primarily for plowing and secondarily for stationary work.

Attempts were made to adapt the tractor to the requirements of cultivation. To get over soft ground they had to be comparatively light and at the same time they had to be heavy enough to furnish traction; they also had to be well powered and easily guided and controlled.

Tractor Now Performs Many Farm Operations

These conditions have been met with varying but increasing degrees of success until it is now possible for the farmer in the corn or cotton belt to plow his ground, cultivate his crops and perform all his other field operations with a tractor.

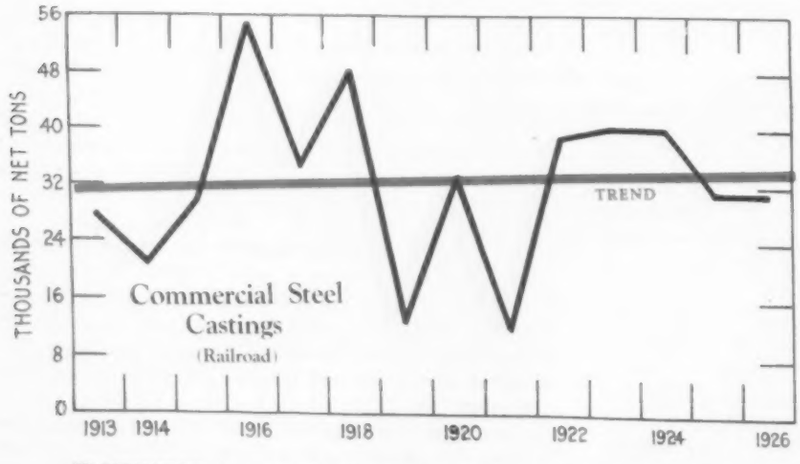
If this development makes the headway some conservative advocates predict, it means the ultimate motorization of most of the farms in this country that are to be farmed at a profit. And it means that the horse, once the farmer's most reliable motor, will approach elimination more closely than used to be thought possible.

Tractor Sales Show Steady Growth

Two years ago approximately 121,000 tractors were manufactured in the United States for domestic sale. Accurate figures are not available for 1926, but it is probable 180,000 machines were made in that year for use in this country. An even heavier production is predicted for the year to come when something like 300,000 new tractors should be at work on American farms.

The farm equipment business is coming back, and few other industries had further to come. Much ground was lost during the five years following that disastrous fall of 1920. But the farm equipment industry, at last, has decided to forget the painful past and set its pegs for a promising future based upon an attractive present.

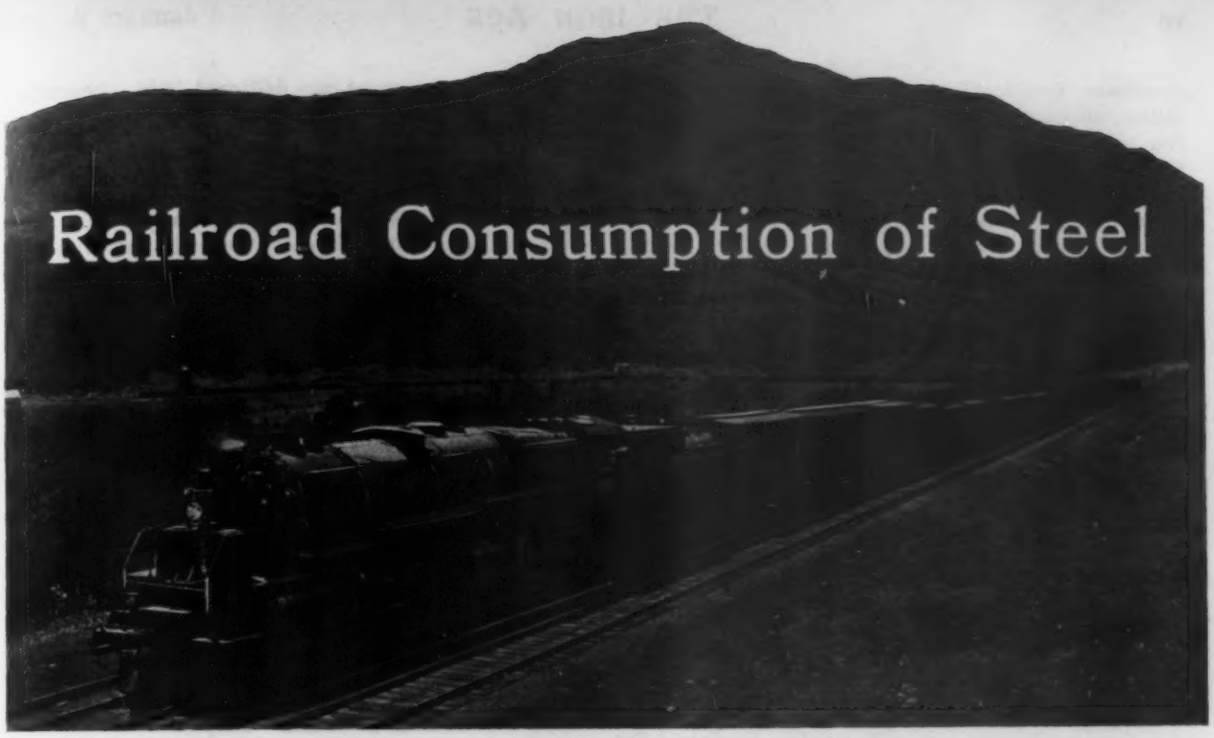
Commercial Steel Castings



BUSINESS in Steel Castings for Railroad Use Has Shown a Checkered Career, But With a Slowly Rising Trend. During the past five years the average has shown about 36,000 tons per month, which is somewhat above the current trend.

MONTHLY reports on commercial steel castings have been furnished for a long time by the United States Department of Commerce. The figures are divided into two general groups, one relating to castings for railroad use, while the other is miscellaneous castings, or castings for all other uses, shown on page 69. Our two trend lines, one for each case, cover 14 years, and both show an upgrade.

From the diagram it will be noted that the trend line for the railroad commercial steel castings entered 1913 with about 31,300 net tons per month. It enters 1927 with about 33,900 tons per month. This increase over a period of 14 years is a little over 8 per cent. The increment is about 185 tons per month.



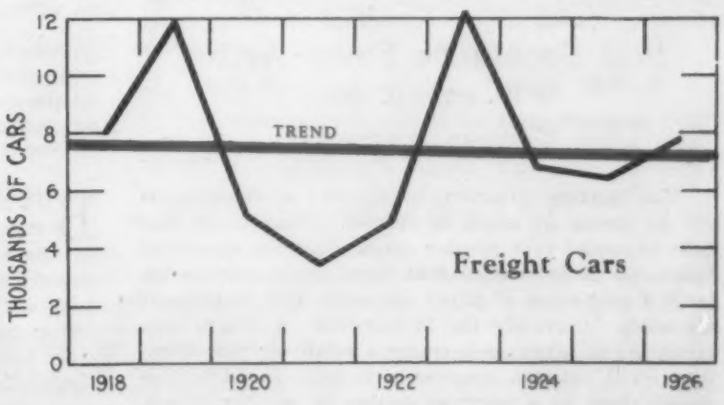
Capital Expenditures in 1926 Large Despite Marked Falling Off in Orders for Freight Cars—Steel Ordered Showed Increase Over 1925

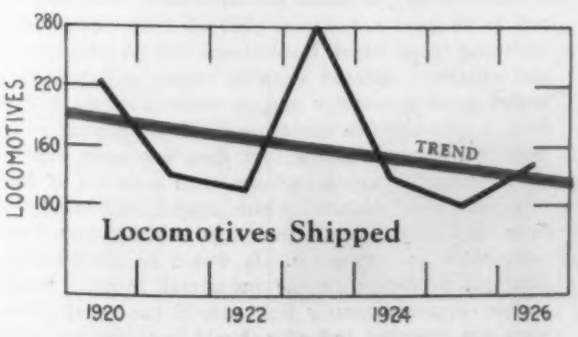
DESPITE a marked falling off in the number of freight cars ordered and a rather low record of locomotive purchases, the capital expenditures of American railroads in 1926 amounted to $825,000,000, a high figure, with $450,000,000 worth of authorized work carried over into this year. Budgets for 1927 indicate that total expenditures this year will at least equal those of 1926.

Steel purchases during the year approached those of 1925, the railroads taking approximately 23 per cent of all of the steel produced by American mills, as is shown more in detail on another page of this issue.

The American Railway Association announces that capital expenditures in 1926 for railroad equipment were approximately $380,000,000 compared with $338,000,000 in 1925. Capital expenditures for roadway and

FREIGHT car orders are no longer on the 200,000-per-year basis. In 1919, and again in 1923, shipments averaged about 12,000 per month. Since 1923, however, the average has been only about 7000 per month, indicating an annual average of considerably less than half that previously regarded as normal. The trend line shows a distinct decline from 7685 at the beginning of 1918 to 7129 at the beginning of 1927.





WHILE locomotive shipments in 1923 averaged 281 per month, the figures since that time average only about 125. As to locomotives, the influence of heavier units and longer trains together possibly with greater endurance of the units in service, has tended toward lowering the number of locomotives purchased.

structures, additional track, heavier rails, additional ballast, shops and engine houses, including machinery and tools, amounted to $495,000,000 compared with $410,000,000 in the preceding year.

To car and locomotive builders the small volume of railroad purchases of their output last year was a distinct disappointment, but several factors contributed to this situation. First, the railroads last year had fewer locomotives and freight cars in need of repair than at any time in recent years, despite the record traffic they were called upon to move; further, the average carrying capacity of freight cars has been increased in the last two or three years 2.1 tons per car or 4.9 per cent. An explanation for the small number of locomotives ordered is that the roads at no time had less than 3800 serviceable locomotives stored in good repair which they did not find necessary to put in service.

Freight Cars Ordered Slightly Exceed 50,000

Freight cars ordered in 1926 numbered 51,805, according to records kept by car builders. *Railway Age* lists a total of 9886 cars built by railroads in their own shops, and in addition this publication also lists logging cars, ore cars, air dump cars and other types not included in car builders' estimates unless purchased for use on steam railroads. Thus, the total figure for car purchases arrived at by *Railway Age* is about 67,000.

During the year 79,000 freight cars were built and delivered by the car companies.

These figures compare with 78,000 cars ordered in 1925 and 135,000 in 1924 and with 94,000 cars delivered in 1925 and 104,000 delivered in 1924.

In addition to cars bought by American roads, car companies received orders during the year for 1450 freight cars for foreign service and shipped 2275 cars to foreign railroads.

Freight cars ordered rebuilt during the year numbered about 10,000 and 16,000 were actually rebuilt in car companies' shops. An undetermined number were also rebuilt in railroad repair shops.

Passenger cars ordered by steam railroads in 1926 were 1200; passenger cars delivered, 2050. Interurban, subway and other miscellaneous passenger cars were: 580 ordered and 100 delivered. Self-propelled cars, gas and electric: 65 ordered for domestic service and 10 ordered for foreign service; 75 delivered for domestic service and 25 delivered for foreign service. Street railway cars: 750 ordered for domestic service and 100 ordered for foreign service; 850 delivered for domestic service and 80 shipped for foreign service.

Low Record for Locomotive Orders

Locomotives ordered for domestic service in 1926 totaled 1301, according to *Railway Age*. This compared with 1055 in 1925 and 1413 in 1924, with 1944 in 1923 and with 2600 in 1922. The 1926 volume of orders is with the exception of three years—1919, 1921 and 1925—the lowest record in 12 years. Adding the locomotives ordered for Canadian and for export to other countries the total number of locomotives ordered of American builders was 1542. The total number of locomotives actually built during the year for domestic service was 1585 as against the 1925 total of 994.

Railroads were large buyers during the year of signaling and interlocking systems, the business in that line establishing a record. They also bought quite heavily of rail motor equipment and motor buses. There were purchases during the year of 173 buses, 65 trucks and 13 passenger cars. *Railway Age*, which gathers these latter figures, concedes the probability that they are incomplete as showing the extent to which railroads are engaging in bus transportation.

New Mileage Greatest Since 1916

"The year 1926 was the most active in point of construction since the war," *Railway Age* points out, "the mileage of new lines completed being 35 per cent greater than in 1925 and exceeding 1000 miles for the first time since 1916. The confidence with which the managements are facing the future is indicated by the fact that an equally large contruction of new mileage is in prospect for 1927."

1927 Should Be Fairly Active

BY DR. LEWIS H. HANEY

(*Concluded from page* 13)

The banking situation, to my way of thinking, is not so strong as could be desired. Bank credit has been expanded to a greater extent than the volume of business. It is possible that bank assets contain too large a proportion of paper connected with installment financing. Certainly the investments in stocks and bonds are so large as to create a relatively new situation, which raises a question as to what would happen should there be a material decline in security values. The ratio of loans and discounts to net demand deposits has increased and nearly reached a danger point.

One hears a good deal of talk to the effect that powerful banking interests have helped to keep interest rates lower than is desirable, thus stimulating speculation in stocks and bonds. It is difficult to appraise the situation, but I would call attention to the fact that money rates are not so low as they seem to be. For several months the New York call loan and time loan rates have been appreciably higher than the average yield on high-grade bonds. This is a situation which usually requires a sharp readjustment in security prices.

Other unfavorable symptoms are the reduction in profit opportunities, the continued high cost of construction, the large part that luxuries play in the current volume of business, and the fact that the trend of the money rates has not been adjusted to the trend of commodity prices.

No Crisis Appears in Sight

BUT the fact remains that, while there are a good many signs that we are well along in the prosperity phase of the business cycle, there is not likely to be any crisis or period of sharp general liquidation. We have not had the usual excesses which occur when, with rising commodity prices, production runs ahead of what could be sold at a profit, and there is a general speculative pyramiding attended by increased monetary strain.

Accordingly, it seems probable that, while 1927 will not be so good a business year as 1926, the irregular declining trend which I anticipate will be quite gradual and orderly. Inflated security values will have to be scaled down materially and, in some cases, as with pig iron, a considerable curtailment of production will be required. But at present it does not seem that the stage is set for anything more than a period of fairly moderate readjustment, which might well bring business back to a more normal level without any drastic liquidation or depression. It would be foolish to say that all is well with the industrial world. But the patient is not seriously sick and, if the usual precautions are observed, industry should be fairly active during most of 1927.

Year's Expansion in Capacity

Over 1,250,000 Tons Added to Pig Iron Last Year, Largest Since War—Increase in Open-Hearth of 865,000 Tons—Small Expansion for 1927—Large Sales of Electric Furnaces

LARGE additions to both pig iron and steel-making capacity were made in 1926. The feature was the increase in pig iron capacity, which was the largest since the war. Over 1,250,000 gross tons per annum was represented by the six blast furnaces completed and blown in last year. New open-hearth capacity completed last year, representing 865,000 tons, was the second largest since the war. Six new blast furnaces and 12 new open-hearth units were added in 1926.

In projected expansion to capacity the new year does not loom large. Three blast furnaces are planned for completion, but only 3 open-hearth furnaces will probably be added by the end of 1927. The blast furnaces represent an estimated yearly output of 605,000 tons, with 245,000 tons credited to the 3 new open-hearths—the smallest since the war.

Another year of large increases to electric steel furnace melting capacity was made last year—the 41 furnaces contracted for or installed in 1926 was second only to the 43 new furnaces in 1925. The total number of furnaces in the United States is estimated at about 500.

Additions Made to Iron, Steel and Rolling Mill Capacity

MAJOR details, covering new construction and equipment completed in 1926 or planned for completion in 1927, have been collected from companies in the United States having blast furnaces, steel plants and rolling mills and from some foundries. The feature for 1926 was the large increase in blast furnace capacity, the largest since the war. A summary of the companies' replies follows:

Open-Hearth Capacity Added in 1926

Increases in open-hearth capacity last year were large. The total was close to the largest since the war. The 1926 additions consisted of 12 furnaces having an estimated capacity of 865,000 gross tons per year. This is second only to the expansion in 1923 of 875,000 tons for 19 furnaces. In 1925 the increases to capacity were 585,000 tons for 10 furnaces. A feature last year was the large size of most of the furnaces. The distribution of the new additions last year is shown in an accompanying table.

The additions to open-hearth capacity in 1926 were made by the following companies:

Tennessee Coal, Iron & Railroad Co., Fairfield Works, four 100-ton furnaces; Bethlehem Steel Corporation at its plant at Sparrows Point, Md., three 100-ton furnaces; Weirton Steel Co., Weirton, W. Va., three 200-ton furnaces; Sheffield Steel Corporation, Kansas City, Mo., one 65-ton furnace and Heppenstall Forge & Knife Co., Pittsburgh, one 18-ton furnace.

Only three open-hearth furnaces are reported as scheduled for probable completion in 1927—the smallest total since the war. This program compares with 14 in 1926, with 9 in 1925, with 7 in 1924, with 17 in 1923, with 6 in 1922, with 15 in 1921 and with 22 in 1920. The largest number ever scheduled for one year was 91 furnaces in 1916—one of the years of large war expansion.

Open-Hearth Construction Planned for 1927

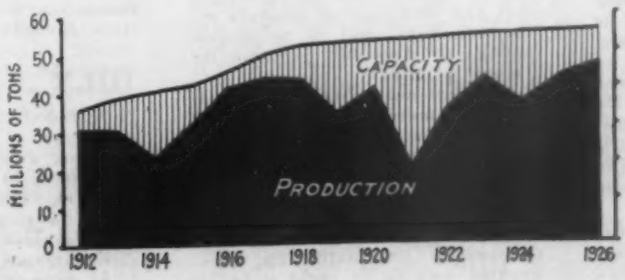
The estimated capacity of the three furnaces which will probably be completed this year is 245,000 tons—all for the production of ingots. Last year the sched-

(*Continued on page* 82)

HOW production is narrowing the gap between demand and capacity is shown by the gradual reduction in width, since 1921, *of the shaded area, which corresponds to idle capacity. The black area represents production of steel ingots and the top curve indicates the total steel ingot capacity. The curve of output shows the high percentage of capacity demanded in the war period, and that some approach to that scale of activity was made in* 1926.

Additions to Open-Hearth Capacity Since the War

Year	Annual Capacity, Gross Tons
1919	625,000
1920	675,000
1921	247,500
1922	227,500
1923	875,000
1924	375,000
1925	585,000
1926	865,000



Increase in Open-Hearth Capacity

	No. of Furnaces	Annual Capacity, Gross Tons
Completed in 1926:		
Independent companies	8	615,000
United States Steel Corporation	4	250,000
Total	12	865,000
Projected for 1927:		
Independent companies	3	245,000
United States Steel Corporation	0	.....
Total	3	245,000

High Lights of 1926—

JANUARY

5. Howard J. Force, engineer of tests, Delaware, Lackawanna & Western Railroad, patents rail steel in which manganese percentage is varied according to carbon content.

7. Alan Wood, Iron & Steel Co., Philadelphia, and Heald Machine Co., Worcester, Mass., announce hundredth anniversaries of their founding.

15. United Steelworks Co., formed by merger of largest producers of iron, steel and coal in western Germany.

15. American Iron and Steel Institute directors adopt figures of its committee fixing annual practical capacity of steel ingot production in United States at 50,000,000 tons and theoretical capacity at 56,000,000 tons. Same committee fixes practical capacity for production of pig iron, exclusive of ferroalloys, at 45,000,000 tons and theoretical capacity at 50,500,000 tons.

20. Southern Ohio Pig Iron and Coke Association approves method of determining annual blast furnace capacity by multiplying daily rated capacity by 350 working days.

21. Reinforcing Steel Institute of California, to overcome ruinous competitive business on Pacific Coast, is formed at second annual conference of Iron, Steel and Allied Industries of California.

21. Weirton Steel Co., Weirton, W. Va., places contract for new 800-ton blast furnace as part of proposed plant extension.

FEBRUARY

1. Leading manufacturers of cement coated nails discontinue practice of selling on count keg basis, substituting 100-lb. keg and establishing same base price as wire nail base.

4. Important changes in definition of No. 1 heavy melting steel scrap and measures to protect consumers from inclusion of alloy steel are adopted by representatives of blast furnaces, steel plants, foundries and trade organizations.

25. American Engineering Standards Committee inaugurates project for undertaking a unification of existing specifications for cast iron pipe into a consistent set of nationally recognized standards.

MARCH

5. Interstate Commerce Commission orders Jones & Laughlin scale of freight rates, reducing cost of hauls from western Pennsylvania, eastern Ohio and West Virginia to St. Louis and Illinois and Indiana points, to go into effect on May 29.

10. International steel rail association formed by Great Britain, France, Germany, Belgium and Luxemburg to control output and allocate quotas and markets.

15. More than 38,000 employees of Bethlehem Steel Corporation apply for stock under company's plan of stock ownership, according to announcement of Eugene G. Grace, president of the corporation.

15. Boston & Maine Railroad buys some 15,000 tons of steel rails and 5000 tons of tie plates from Krupp plant in Germany.

16. Merger of American Locomotive Co. and Railway Steel Spring Co. brings largest railroad equipment manufacturing organization in country under one head.

17. Weakness in pig iron said to be responsible for establishing Lake Superior iron ore prices on same level as 1925 in spite of unprofitable operation by nearly all large companies during that period.

18. Composition and heat treatment of high-tensile normalized forgings and billets, development in inspection and rejection of imperfect forgings and forging billets and formulation of new tentative specifications for certain aluminum alloys and for metals at very high temperatures are high spots in year's activities of American Society for Testing Materials as planned in fifth group meeting of its committees.

31. Steel ingot production during month at rate of 166,236 tons daily sets year's peak, and utilizes 92.58 per cent of country's capacity.

APRIL

1. United States Steel Corporation completes first quarter century of successful activity, having more than doubled its production of pig iron, steel ingots and finished products without increasing original capitalization.

6. Break of $1.50 a ton on foundry iron and $1 a ton on other grades occurs in Pittsburgh and Valley district as result of 5000-ton purchase which gave market its first test in months.

15. Checks representing refunds of freight charges on pig iron shipped from 1910 to 1915 are distributed to 35 foundries in St. Louis by Sloss-Sheffield Steel & Iron Co., Birmingham, following judgment finally obtained against railroads after 10 years of litigation.

15. Canadian steel makers begin agitation for tariff to protect business from competition of American mills. Tariff board is appointed to investigate conditions.

19. William Bacon Schiller, president of National Tube Co., retires after 45 years in steel business and is succeeded by Taylor Allderdice.

20. Preliminary plans for proposed Agricultural Mart in Chicago call for 70,000 tons of structural steel and 7000 tons of concrete reinforcing bars, said to be largest tonnage of steel ever required for a single building.

20. Representatives of large majority of merchant pig iron producers in country appear before tariff commission to ask for 50 per cent increase of tariff on foreign pig iron.

22. Starting of new South Chicago plant of Valley Mold & Iron Corporation, Sharpsville, Pa., inaugurates making of ingot molds in Middle West.

27. Common stock of Steel Corporation placed on 7 per cent basis.

30. Production of 115,004 tons of pig iron daily during month sets high mark for year.

30. Peak in year's automotive production reached in April with total output of 383,907 automobiles and 50,314 trucks.

MAY

1. General strike in Great Britain paralyzes that country's industry with wide effect on iron and steel markets in all parts of the world.

7. National Machine Tool Builders' Association decides to hold independent machine tool exhibition at Cleveland during fall of 1927 in effort to reduce number of shows at which builders must exhibit and to provide single comprehensive exposition for metal working industry in its most concentrated form.

13. National Committee on Metals Utilization is formed under auspices of Department of Commerce to provide for more effective elimination of waste in the metals industries through coordination of efforts of various technical, scientific and trade organizations.

18. Announcement of earnings of 42 steel companies in 1925 shows return of 5.9 per cent on investment, as compared with 4.8 per cent in 1924.

29. Manufacturers, distributers and consumers of wrought iron and wrought steel pipe, valves and fittings adopt simplified list of standard sizes and eliminate little used and specified sizes of their products as part of waste elimination program of Department of Commerce.

JUNE

18. Order imposing countervailing duties on iron and steel products from Germany, to have been effective June 20, is suspended by Treasury Department as result of complaints by German importers, and joint commission of producers of both countries is appointed to determine real facts regarding alleged German bounty.

30. Production of approximately 24,250,000 tons of steel ingots during first six months of year establishes a new record for any similar period in history of industry.

30. Imports of iron and steel products in June, at 124,215 tons, reach year's peak. Total highest since January, 1923.

JULY

1. Delco Light Co., Dayton, Ohio, subsidiary of General Motors Corporation, announces immediate inauguration of $20,000,000 expansion program, $5,000,000 of which will be spent for new buildings, $7,000,000, for machinery and $8,000,000, for raw materials.

1. Twenty years of organized accident prevention in the plants of

Metal Trades in Review

the United States Steel Corporation has saved 46,000 men from death or serious injury, has averted accidents which would have disabled 322,000 workmen and has resulted in large saving of money, according to report of corporation's bureau of safety.

2. Eastern Pennsylvania sheet makers, testifying in Bethlehem merger case, say they have made no profits since war and, in many cases, have shown actual operating deficits on account of low prices on their product.

22. Merger of United Alloy Steel Corporation, Canton, Ohio, and Central Steel Co., Massillon, Ohio, as Central Alloy Steel Corporation brings together approximately 60 per cent of country's alloy steel capacity.

29. Westinghouse Electric & Mfg. Co. stages demonstration of arc welding of fabricated steel, and announces plan to build five-story building with arc-welded frame.

31. Production of 694,000 metric tons of steel ingots in France during month sets new record for that country.

AUGUST

5. Forty-eight company members of American Malleable Castings Association, representing 87 separate defendants, are fined $2,500 each in Cleveland Federal Court upon entering nolo contendere pleas for alleged violation of anti-trust laws.

15. Japanese Government plans increase of tariff on iron and steel imports when Ministry of Commerce and Industry fails to validate claims by domestic makers of dumping by foreign producers.

18. Navy Department lets contract for metal-clad airship, to be built of duraluminum with hydrogen capacity of 200,000 cu. ft., as experimental step looking toward construction of large all-metal ships.

SEPTEMBER

1. Leading producers adopt No. 24 instead of No. 28 as base gage on black sheets and galvanized sheets and announce new set of gage differentials applicable to these products.

5. Production of 154,022 tons of steel ingots daily during August resulting from unusually high rate of summer activity sets new record for that month.

11. Inland Steel Co. changes 36-in. blooming mill from steam to motor drive in six days, establishing record for major equipment replacement.

14. New York Board of Transportation rules against use of foreign steel in subway construction planned by city which will require 400,000 tons.

15. Concrete Reinforcing Institute adopts standard code of reinforced concrete construction at semi-annual meeting.

15. Survey showing 17 installations of by-product coke ovens now in progress, embracing 1167 units and to have annual rated capacity of 10,469,142 tons of coal, marks highest rate of activity in industry's history, excepting war period.

20. More than 100 European foundrymen, representing Great Britain, France, Germany, Belgium, Italy and other countries, arrive in New York for industrial inspection tour preceding International Foundry Congress at Detroit.

20. Eighth annual convention and machine tool exposition of American Society for Steel Treating at Chicago breaks all previous records in attendance, number of exhibitors and technical excellence.

27. New blast furnace of Mystic Iron Works at Everett, Mass., is blown in, inaugurating manufacture of coke pig iron in New England.

27. Thirtieth annual convention and exhibition of American Foundrymen's Association and second International Foundry Congress open in Detroit with usual surpassing of previous records in activity and interest.

30. International steel cartel is formed by steel manufacturers of Germany, France, Belgium, Luxemburg and the Saar in an attempt to avoid overproduction by proportioning output according to consumption needs.

OCTOBER

1. September sales of sheets by independent makers, totaling 448,147 net tons, exceed by 45,000 tons all previous records, while unfilled orders aggregating 731,977 tons are higher than ever before in the industry.

11. Following two years' investigation at instigation of Eastern blast furnace interests, Treasury Department rules that Indian pig iron imported into this country is not violating anti-dumping act.

12. Granting of basic patent to American Rolling Mill Co. for continuous rolling of sheets and thin plate metal in such a way that changes in shape and distortions of rolls are utilized as an advantage is first radical development in process for many years.

15. Steel Corporation will erect plant at Lorain, Ohio, works of National Tube Co., to experiment on Hornsey process for substantially direct production of steel from ore.

16. World's leading copper producers form organization to control exports and eliminate in foreign countries harmful speculation and unwarranted fluctuations in price.

25. Leading American manufacturers express disapproval of five-day week recently put into operation by Ford Motor Co., consensus of their opinion being that the plan is not applicable to industry in general.

NOVEMBER

1. A. M. Byers Co., Pittsburgh, secures two-year lease with option to buy plant of American Puddled Iron Corporation, Warren, Ohio, and will carry on experiments in puddling iron by the Aston process.

9. IRON AGE composite price of pig iron at $20.21 reaches highest level since spring as result of high prices of coal and coke occasioned by English strike.

15. Merger of Aetna Foundry & Machine Co., Warren, Ohio, and Standard Engineering Co., Ellwood City, Pa., as Aetna-Standard Engineering Co., brings together two of country's leading makers of steel mill equipment.

17. National Founders Association urges reduction in Federal taxes, particularly in tax on corporations, at annual convention in New York.

18. "The business cycle theory is the chief bogey man of business," says M. C. Rorty, vice-president of International Telephone & Telegraph Co. in address before National Founders Association.

20. Interstate Commerce Commission orders general investigation of rates on manufactured iron and steel throughout Official Classification territory as result of Jones & Laughlin case.

22. Department of manufactures, Chamber of Commerce of the United States, begins scientific study of iron and steel industry for purpose of establishing standard rates of depreciation needed for taxing purposes.

DECEMBER

1. Exports of 219,830 tons of iron and steel products during November sets record for year and is highest total since January, 1924.

1. Indian manganese ore producers and British makers of ferromanganese form United Kingdom Ferromanganese Co., Ltd., in effort to stabilize supply and price of product.

5. Importers of German steel receive notices of violation of anti-dumping act from appraiser of port of New York, requiring them to show reasons why anti-dumping act should not be invoked.

6. Developments in use of chromium plating arouse considerable interest at meeting of A. S. M. E. in New York, when authority states that gages so treated show 10 to 20 times more wear than ordinary steel, and may be replated after wear.

15. Czechoslovakia, Hungary and Austria are admitted to European raw steel cartel.

15. American Sheet & Tin Plate Co. makes unusual record in continued production by having all 256 of its mills in operation from Dec. 1 to 6, inclusive.

16. Directors of United States Steel Corporation vote 40 per cent stock dividend on common stock of company, amounting to $202,321,000 in par value, and being first addition to capital of organization since its founding in 1901.

17. Three large companies in Pittsburgh district and another at Lorain, Ohio, announce extensive additions to their seamless tube capacities during coming year.

(Continued from page 79)

ule called for 14 furnaces with a capacity of 955,000 tons; 12 of these were completed, the other two having been abandoned. In 1925, plans called for the building of 9 furnaces with a capacity of about 525,000 tons. The smallest projected capacity on record was 217,500 tons for 6 furnaces in 1922. The largest contemplated increases to capacity during peace years were 3,100,000 tons for 88 furnaces in 1913—during the war the maximum was 4,515,000 tons for the 72 furnaces in 1917.

The following companies plan new open-hearth furnaces in 1927:

Weirton Steel Co., Weirton, W. Va., one 200-ton furnace; Timken Roller Bearing Co., Canton, Ohio, one 100-ton furnace, and Otis Steel Co., Cleveland, one 100-ton furnace.

Several companies remodeled and increased the capacity of some of their open-hearth furnaces, one company expanding its units from 60 tons to 100 tons each.

Record Last Year in New Blast Furnace Capacity

The feature for 1926 was the large expansion in blast furnace capacity. During the year 6 large furnaces were completed and put in operation—equaling the record of 1920. In capacity expansion, however, last year is a post-war record; the 6 furnaces have an estimated capacity of 1,255,000 tons, while in 1920 the capacity of the 6 new furnaces was put at 875,000 tons.

The additions last year compare with 2 in 1919, with 6 in 1920, with 1 in 1921, with 2 in 1922, with none in 1923, and with 1 each in 1924 and 1925. The addition last year of 6 furnaces compares with 5 furnaces for the previous 5 years. The record in new furnaces completed in any peace year was 9 in 1912; the war record was 14 in 1917.

Only 3 furnaces were under construction for possible completion in 1927. This compares with 9 in 1926 and with 5 during the three years, 1921, 1922 and 1923. The record for those projected for completion in any one year was 25 in 1917, with the peace time record in recent years at 7 in 1913. The capacity of the 3 furnaces under construction is estimated at 605,000 tons, or about half the capacity added in 1926.

The blast furnaces completed last year and at present under construction are given in detail in the following table:

Company	Completed in 1926	Under Construction or Projected
Central Furnace Co., Massillon, Ohio	1	..
Mystic Iron Works, Everett, Mass.	1	..
Hudson Valley Coke & Products Co., Troy, N. Y.	1	..
Weirton Steel Co., Weirton, W. Va.	1	..
St. Louis Coke & Iron Corporation, St. Louis	1	..
Inland Steel Co., Chicago	1	..
Tennessee Coal, Iron & Railroad Co., Fairfield Works	..	2
American Rolling Mill Co., Ashland, Ky.	..	1
Total	6	3

Several Furnaces Enlarged or Rebuilt

The rebuilding and enlarging of present blast furnaces was quite extensively carried on last year and is still part of the program of several companies. The Wheeling Steel Corporation reports that it is enlarging one Steubenville furnace from 475 tons to 750 tons daily capacity. The Donner Steel Co. replaced last year an old furnace with a new one, the latter a 600-ton stack. The Republic Iron & Steel Co. replaced its No. 2 Haselton furnace, in Ohio, 500 tons, with a 700-ton furnace. The Youngstown Sheet & Tube Co. enlarged one of its Mayville furnaces, in Wisconsin. The Carnegie Steel Co. and the National Tube Co. have rebuilt and are rebuilding 11 furnaces at various plants.

The abandoning and scrapping of blast furnaces was continued quite extensively last year. On Jan. 1, 1926, THE IRON AGE carried 379 furnaces as serviceable; by Jan. 1, 1927, this number had been reduced to 365, which, with the 6 added during the year, brings the total as of Jan. 1 to 371. In other words, 14 furnaces were taken from the list and 6 added, a net loss of 8 for the year.

The chief features of the various companies' reports on new construction completed or planned are as follows:

The Steel Corporation

NEW construction and improvements completed during 1926 and under way as of Jan. 1, 1927, by subsidiary manufacturing companies of the United States Steel Corporation, are as follows:

Carnegie Steel Co.

Completed

Edgar Thomson Works: Two additional ingot heating furnaces at blooming mill.

Homestead Works: Remodeling 2 furnaces at open-hearth plant No. 1.

Carrie Furnaces: Rebuilding blast furnaces Nos. 6 and 7 and ore handling facilities for blast furnaces Nos. 1, 2, 5, 6 and 7.

New Castle Works: New Central plant furnace gas-fired boiler plant, including building and 7 200-hp. boilers.

Ohio Works: Two 15,000-kw. turbo-generators and auxiliary equipment; rebuilding blast furnace No. 3.

McDonald Mills: 14-in. bar mill.

Mingo Works: Rebuilding blast furnace No. 2.

Farrell Works: 16 800-hp. boilers at blast furnaces Nos. 1 to 3.

Under Way

Edgar Thomson Works: Turbo blowing equipment for 2 blast furnaces, replacing obsolete steam engine equipment; 15,000-kw. turbo-generator and auxiliary equipment in power station.

Duquesne Works: New central boiler plant at blast furnaces.

Homestead Works: Installing 44-in. and 54-in. blooming mills, 36-in. roughing mill, 28-in.-32-in. structural and 52-in. universal structural mills in lieu of obsolete mills.

Carrie Furnaces: Rebuilding blast furnaces Nos. 3 and 4.

Ohio Works: 15 waste heat boilers at open-hearth plant; two 1200-ton hot metal mixers, for Bessemer and open-hearth departments.

Upper Union (Youngstown) Works: Electric motor equipment to operate mills, replacing steam power.

McDonald Mills: 12-in. strip mill and 14-in. bar mill.

Mingo Works: 8 1200-hp. gas-fired boilers in No. 2 blast furnace boiler house.

Clairton Works: Addition to by-product coke plant of 4 batteries, 87 19-ton ovens each, with tar and ammonium sulphate recovery, benzol plant and gas booster station and auxiliary facilities.

Illinois Steel Co.

Completed

Gary Works: Additional unit of 138 by-produt coke ovens with auxiliary facilities and extension to benzol plant; steam turbo-electric generating plant, 2 15,000-kw. generators and 8 1200-hp. boilers; new water pumping station No. 2, including building and pumping equipment.

Under Way

South Works: A 40-in. reversing blooming mill in No. 1 rail mill; merchant bar mill for production of alloy steels; gas engine-driven electric generating unit addition to power station.

Joliet Works: New boiler plant.

Gary Works: New 10-in. and 9-in. merchant mills; increase in capacity of ore yard at blast furnaces; additional 30,000-kw. steam turbo-electric generating unit in power station.

American Steel & Wire Co.

Completed

Newburgh Steel Works: Rebuilding Bessemer and cupola buildings.

Waukegan Works: 100-ft. extension to spring department building and installing modern heat treating and japanning equipment.

Rankin Works: Additions to boiler plant.

Worcester, North Works: Continuous wire drawing equipment for fine weaving wire.

Worcester, South Works: 5 500-hp. water tube boilers.

Fairfield Works: 30 continuous bale tie machines.

Under Way

Newburgh Steel Works: New scrap and mold yards at open-hearth plant.

Newburgh Wire Works: Electrification of Nos. 1 and 2 wire mills.

Cuyahoga Works: Additions to cold-rolling facilities.

In This Issue

New record in world steel output set in 1926.—America produced 54 per cent of the 89½ million tons, the new "high."—Page 50.

Looks for a moderate decline in building construction in 1927.—With 6.8 billion dollars in construction contracts, 1926 established a new record. Building authority forecasts that the total this year will be about a half billion less.—Page 62.

Believes 1927 *automotive production will compare favorably with* 1926.—Last year's output was about 4.3 million vehicles. The estimate for 1927 is between 3.9 and 4.5 millions.—Page 59.

Demands of oil industry will be on the same scale as 1926, *says authority.*—Does not look for any lessening in pipe and plate requirements. Oil industry's interest in alloy steels, for strength and corrosion resistance, is increasing.—Page 36.

Outlook is not so favorable as one year ago, says Dr. Haney.—Pointing to general downward trend, does not believe that 1927 can equal the mark set last year.—Page 12.

Iron and steel warehouse business is dwindling.—General prevalence of hand-to-mouth buying has induced steel producers to accept and even solicit small orders formerly regarded as strictly warehouse business.—Page 21.

Water transportation is reducing delivery costs of iron and steel.—Producers are taking increasing advantage of water freight routes as a means of breaking the market limitations imposed by high rail rates.—Page 14.

Great economies can be effected by better balance between consumption and production.—Gradual integration of production forces into fewer, larger units will bring this about, says George M. Verity.—Page 26.

Says great majority of foundries are sadly lacking in dependable cost finding.—Uniform cost system would eliminate the worst form of competition, that of the man who does not know his costs.—Page 30.

Machine shop jigs made of magnesium reduce costs.—Saving in weight is considerable, and lightness enables operator to work faster.—Page 55.

The five-day week is nothing new.—Depressions or declines have frequently caused its adoption temporarily in the past. If agitated on other than purely economic grounds, disaster may be invited.—Page 35.

Gambling element is gradually being taken out of the scrap business.—Wide price fluctuations were the very life blood of this business in the past. But now prices vary little. In the new era now dawning profits will be made on service rendered.—Page 38.

Machine tool buyers' demands are steadily toward more specialized equipment.—Makers find they are further away than ever from standardized tools. Selling costs are inevitably increased, as special machines require salesmen with specialized knowledge.—Page 40.

Questions wisdom of the dictum, "It must pay for itself in one year!" with regard to machinery purchases.—Some manufacturers who are content to make 8 to 10 per cent on their capital deprive themselves of 33 to 50 per cent profit that could be made on a new machine.—Page 43.

Will there be another soft coal strike?—Operators will probably refuse to renew present wage scale and miners will refuse a reduction. Stocks on hand April 1 will be so large as to relieve consumers of worry over strike.—Page 71.

Hand-to-mouth buying is adding to steel producers' costs.—But competition is so keen that small-order extras are not added. Distributers believe producers should keep out of the warehouse business, and that they are tolerating an economic waste by accepting small orders.—Page 23.

Two-thirds of 1926 *steel output was consumed by railroad, building, automotive, and oil industries.*—IRON AGE analysis of steel distribution shows that rail production was highest since 1913; and that a new high record in pipe production was established.—Page 6.

Steel industry made new production record in 1926.—Output of ingots was over 47 million tons, a gain of almost 3 million tons, or more than 6 per cent, over 1925.—Page 1.

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Central Furnaces and Docks: New boiler house, pump house, 10,000-kw. turbo-generator, electric power transmission line to Cuyahoga Works and main water and sewer lines.

American Works: Continuous wire drawing equipment for fine weaving wire.

Rockdale Works: 24 continuous wire drawing machines

DeKalb Works: 24 continuous wire drawing machines.

Worcester, South Works: Rebuilding and improving rolling mills, including new 18-in. billet mill, new 10-in. continuous rod mill No. 3 and modernizing Nos. 1 and 2 rod mills.

Worcester, Electric Cable Works: Increasing capacity for manufacture of enameled magnet wire.

National Tube Co.

Completed

Gary Works: 14-in. and 16-in. continuous skelp mills, 42-in. universal skelp mill and auxiliary facilities.

Lorain Works: Improving blast furnaces Nos. 1, 2 and 5; 3 turbo blowers and equipment, replacing blowing engines Nos. 1 to 5; 9000-kw. turbo-generator with auxiliaries at blast furnace power plant.

National Works: Rebuilding blast furnace No. 4 and 4 stoves at blast furnace No. 1.

Under Way

Gary Works: Additional billet heating furnace wtih auxiliary equipment at No. 1 seamless mill.

National Works: Rebuilding blast furnace No. 2.

American Sheet & Tin Plate Co.

Completed

New Castle Works: Rebuilding and modernizing assorting room, warehouse, shop building, scruff house and extending annealing building.

Laughlin Works: 723-hp. boiler with stoker equipment.

National Works: Replacing Nos. 3 and 4 hot mill engines with motor drive.

Vandergrift Works: 1000-kw. motor generator set.

Under Way

Gary Tin Mill: Enlargement of plant including installation of new motor-driven continuous mill with auxiliary facilities, increasing finishing capacity.

Vandergrift Works: New heavy duty uniflow engine for hot mill and rebuilding sheet and pair furnaces for mills Nos. 22 to 25.

Scottdale Works: Motor drive for hot mills and rearranging hot mill department; modern bar storage building with electric overhead traveling crane.

Tennessee Coal, Iron & Railroad Co.

Completed

Ensley Works: Improvements to blast furnaces Nos. 3 and 4 and 2 additional stoves at blast furnaces Nos. 1 and 6.

Bessemer Rolling Mills: Equipping 8-in. guide mill to roll cotton ties.

Fairfield Works: 4 additional open-hearth furnaces, Nos. 5 to 8; new sheet and jobbing mill and auxiliary facilities; new boiler house, 2 779-hp. stoker-fired boilers at by-product coke plant.

Under Way

Fairfield Works: 2 new blast furnaces, Nos. 5 and 6; 2 additional soaking pits and extending building; electric power plant of 2 25,000-kw. turbo-generators; additional spike, bolt and nut units for rail fastenings department; addition to by-product coke plant of battery of 63 13-ton coke ovens; modern gas exhauster and saturator equipment at by-product coke plant.

Bethlehem Steel Corporation

THE subsidiary companies of the Bethlehem Steel Corporation report the following improvements and additions completed in 1926 and under way at the close of the year at the various plants:

Bethlehem Plant, Bethlehem, Pa.

Completed in 1926: Electrification of the hot beds of the Bethlehem structural mills; one 125-ton ladle crane in open-hearth department No. 3 and a pouring pit in open-hearth department No. 1; additions and improvements to the brass foundry, including an extension to the building; an enlargement of the crane runway; a new 20-ton crane; a centrifugal casting machine; a molding and drying pit and one oil fuel melting furnace; in the rolling foundry, oil storage tanks and two core ovens; for the ingot mold foundry, a mixer type ladle, sand mixing equipment, an ingot mold stripping machine and a molding pit; electric motor and control for 9-in. bar mill No. 3; a brick office building at the billet yard and an extension to the mill office building of the Lehigh mills; an extension to the shipping yard office of the Saucon mills; coke screening equipment; enlarging the quenching pits and the lime handling equipment for the saturator house at the coke ovens.

Under Way: The installation of one 10,000-kw. turbo-generator set, including the necessary building, crane, superheater, pumps, steam piping, etc.; a gas control system for the gas lines of the Lehigh and Saucon plants; four double pot cinder cars for the blast furnaces; the installation of two Bethlehem twin gas blowing engines, including an extension to the building and two Theissen gas washers, as well as extensions to the gas and air mains; the installation of five heavy duty roll lathes in the machine section of the roll foundry, and additional machine tools for the manufacture of Bethlehem auxiliary locomotives in No. 2 machine shop; a motor driven angle shear and additional equipment for the fabrication of heavy built-up columns and plate work, including crane runways, cranes, three multiple drill presses, etc.

Steelton Plant, Bethlehem, Pa.

Completed in 1926: Motor drives for 34-in. roughing and 28-in. finishing mills; extension to No. 1 power house and rearrangement of equipment; dolomite crusher, repair building for quenching cars at the coke ovens; electric transfer car for 44-in. blooming mill; addition to pattern shop and new pattern storehouse; splice bar quenching equipment and a crane runway for storing bars.

Under Way: Six new gas producers at open-hearth department No. 1; the installation of one Bethlehem gas engine-driven generator set, including an extension to the power house; a gas washer, motors, gas and water lines, etc.; two 500-kw. electric generator sets and one 10-ton overhead crane for the machine shop; sand handling and shake out equipment, storage bin, molding machines and improvements to the core room in the steel foundry; a heating furnace with equipment for the hot punching of die plates; furnace equipment for oil treating splice bars.

Lebanon Plant, Lebanon, Pa.

Completed in 1926: Crushing and screening plant for the sintering department; hot heading and forging equipment, continuous feed headers, three electric heat-treating furnaces for track bolts in the bolt, nut and rivet factory; a 12-in.-16-in. semi-continuous bar mill, including a bar storage building; the remodeling of the steel plant building and the removal into it of all equipment from the Reading plant.

Under Way: A building and equipment for a new tool department and a brick lavatory and locker building.

Maryland Plant, Sparrows Point, Md.

Completed in 1926: Three 100-ton stationary open-hearth furnaces, including an extension to the building, waste heat boilers, etc., two new hot blast stoves for the blast furnaces; one 1291-hp. boiler, including an extension to the building, gas mains, etc.; a conveyor and loading equipment for by-product coke plant; One 46-in. motor driven blooming mill with three rows of soaking pits, including the necessary buildings and equipment; a rod and wire mill, including wire drawing and galvanizing departments, nail and barbed wire factories with the necessary building and equipment; 23 mechanical doublers and shears for the tin plate mill.

Under Way: One 8-strand, 21-in. continuous sheet bar and skelp mill with one 4-strand, 27-24-in. continuous roughing mill; four sheet mills; 12 additional hot mills; two resquaring shears in the tin plate department; one 12-in. continuous skelp mill complete with motor drive, buildings, table, etc.; two butt weld and two lap weld pipe mills complete with buildings, coupling shop, galvanizing department, etc.; combination mill office, employment office and dispensary for the wire mills; three gas producers, including an extension to the building at open-hearth department No. 2 as well as a waste heat boiler; a melting furnace for the brass foundry; one 20,000-kw. turbo-generator set with four 1291-hp. boilers, including the necessary building extension and auxiliary equipment; 50 low side gondola cars; one 2-strand pig casting machine.

Lackawanna Plant, Lackawanna, N. Y.

Completed in 1926: An 18-in.-14-in. structural mill with the necessary buildings, cranes, heating furnaces and other equipment; electric drive for the 12-in. bar mill; a heating furnace at the spike, bolt and nut shop; ladle cars and ladles for the blast furnace department; a pneumatic tube system for conveying samples from the open-hearth furnaces to the chemical laboratory.

Under Way: A complete structural plant, including the requisite buildings; a motor-driven 54-in. blooming and two 48-in. finishing mills with mill tables; soaking pits and other necessary auxiliary equipment; one battery of 57

Koppers by-product coke ovens, including two gas producers; an additional steam boiler and an extension to the boiler house, new gas producers for open-hearth department No. 1; a brick office building and tool house at the rail dock; improvements and additions to the blooming and roughing mill of the rail mill; heat-treating furnaces for splice bars and tie plates; an extension to the finishing building of the plate mill; additional heat-treating furnace and thread rolling equipment for track bolts at the spike, bolt and nut shop.

Cambria Plant, Johnstown, Pa.

Completed in 1926: The acquisition of additional land; four 75-ton ladles for the blast furnaces, an extension to the 8-in. mill building of the Gautier division; millwright office at the 8-in. mill of the lower division.

Under Way: One battery of 77 Koppers by-product ovens, including coal handling plant, mixing plant, etc.; a building for lining and storing cars for casting ferromanganese; a ladle pit for the 75-ton ladles at the open-hearth department of the lower division; additional direct current and generating equipment for the lower and Franklin divisions; waste heat boilers at three open-hearth furnaces in the open-hearth department at the lower division; extension to the stock house, including cranes at the slab mill, Franklin division and a bale die building at the wire mill.

Coatesville Plant, Coatesville, Pa.

Completed in 1926: A fuel oil system for the skelp and bar mills; rotary shears at the plate mill; a machine for flanging and dishing heads and a rotary shear for the flanging department.

Under Way: An extension to the flanging department; improvements to the 120-in. plate mill and a motor drive for the 152-in. plate mill.

Youngstown Steel & Tube Co.

The Youngstown Sheet & Tube Co., Youngstown, completed last year at its various plants the following construction work:

Campbell Works

Blast Furnace Plant: The enlargement of the hearth to 20 ft. 6 in. on "B" furnace, and installation of a 60,000 cu. ft. capacity turbo-blower. Furnace was put in blast on April 1.

Coke Plant: Liquid waste disposal was installed to eliminate odors from the waste water turned into the river.

Steel Works: A 53 ft. x 210 ft. extension built to the open-hearth building to take care of bottom poured ingots; full equipment for bottom pouring, including ingot stripper cranes, was installed. In No. 2 skelp mill electric drive for the edging mill, new tables, cooling beds, hot saws, etc., installed to take care of rounds for automatic seamless mill.

Tube Mills: The Pilger mill for producing seamless tubes from 6 in. to 13 in. and the automatic mill for tubes from 2 in. to 7 in. were put in operation in October.

General: A sub-station was built and placed in operation in the middle of the summer to take care of purchased power. Two motor generator sets, 1000-kw., and full equipment of switchboards have been installed in this building. Power lines have been run into the plant to this sub-station.

The south entrance bridge to the plant has been rebuilt.

Struthers Works

A cleaning house with new equipment has been built for pickling rods and wires. Ten new nail machines have been installed. Nullmeyer wire drawing blocks have been placed in operation. An extension has been built to the rigid conduit department, including a complete unit of electro-galvanizing. In the merchant mills, coiling machines and straighteners have been installed, also complete new billet storage racks for the bar yard.

Brier Hill Works

Coke Plant: A liquid waste disposal, similar to that at the Campbell Works, has been placed in operation. New power lines have been put in from main power station to the coke plant.

Steel Works: Sanitary equipment has been provided; purifiers have been put on the boilers and new pumps have been installed. At the bar mill a Morgan flying shear was placed in operation.

Western Reserve Works

Conveyors for the pickler have been installed, also new slitting shears.

Indiana Harbor Works

Blast Furnaces: A Dorr thickener with filter and necessary conveyors to deliver the filter cake to the ore yard has been placed in operation.

Continuous 21-in. Sheet Bar and Skelp Mill: A Morgan continuous 21-in. sheet bar and skelp mill, consisting of 10 horizontal stands and 3 vertical stands, with its equipment of rotary shear, flying shears, bar piler and cooling beds, has been completed and operation commenced. This work necessitated the addition of boiler equipment, and three 800-hp. boilers with superheaters have been added.

Steel Works: A mold cleaning yard was completed. Ingot cars and charging cars have been replaced. A 12-in. steam line has been run from the main boiler house to the Bessemer blowing engine room. A new transfer for the blooming mill with an 800-ton upcut shear was placed in operation.

General: A metallurgical laboratory and instrument repair shop have been completed. Additions were made to the railroad yard and tracks, and extensive work done toward closing in the property on the north and west sides was completed by putting a heavy type of breakwater in Lake Michigan. An auxiliary pump house was built, and the service water pumps installed in this. New equipment was purchased for the boiler shop, and miscellaneous new equipment, straightener, plugging and reaming machines, threading machines, etc., were purchased for the tube mill.

Tin Mills: On 43 acres south of the Pennsylvania Railroad tracks, the new unit of 24 tin mills has been built and operations commenced last August.

Evanston Works

New machinery purchased for the tube mills and extensions made to the rigid conduit department.

Mayville Iron Co.

"B" furnace enlarged and provided with dry gas cleaning apparatus and new bell operating mechanism. Connections made to public utilities company for selling power.

New construction under way and scheduled for completion in 1927 is as follows:

Campbell Works

A new threading floor for seamless mills; a trolley for No. 1 ore bridge; complete re-building of the socket shop; miscellaneous machine tools and equipment for the mills, and new boiler house contemplated for blast furnace gas.

Hubbard Works

A new boiler plant and extensive track changes to accommodate the Valley Mold & Iron Co.'s new plant.

Brier Hill Works

A normalizing furnace for the sheet mill.

Western Reserve Works

Normalizing furnaces and cooling beds for the jobbing mills.

Indiana Harbor Works

Low head pumps for insuring the water supply; changes to No. 1 tube mill. A manipulator for the 28-in. billet mill and a large extension to the machine shop with necessary complement of machine tools. Extensive additions to the coke plant for Indiana Harbor and South Chicago Works. A new 15-ton ore bridge.

Republic Iron & Steel Co.

The Republic Iron and Steel Co., Youngstown, reports the following as having been completed during 1926:

Haselton furnace No. 2 at Youngstown, rated at 500 tons daily capacity, was dismantled and a new furnace of 700 tons capacity built to take its place.

A 50-ton ore transfer car was added to the Haselton furnace plant equipment.

One new single strand pig casting machine and one double strand casting machine were installed at Thomas furnaces, Thomas, Ala.

A blowing engine and a 300-kw. generator were also added to the furnace equipment at this plant.

A combination 84-in. sheared plate and 60-in. universal mill was installed at the open hearth plant, Youngstown, and the 90-in. plate mill was dismantled.

The 10-in. continuous mill No. 2 at Brown-Bonnell Works, Youngstown, was remodeled.

A sheet and pair furnace and a 750-kw. motor generator set were added to mill equipment at the Niles plant, Niles, Ohio.

Pulverized coal burning equipment for the heating furnaces was added at the Sylvan Works, Moline, Ill.

No. 1 butt weld mill was remodeled and a pipe straightening machine was installed at the tube works, Youngstown.

At the by-product coke works, Youngstown, 43 Koppers coke ovens were dismantled and replaced by 43 Becker type ovens.

The screening station at By-Product Coke Works, Thomas, Ala., was remodeled.

For completion in 1927 there is under construction a 200-ton capacity Greenawalt flue dust sintering plant at the company's Haselton furnaces.

Weirton Steel Co.

The Weirton Steel Co., Weirton, W. Va., last year completed and put in operation a new blast furnace with a rated capacity of 800 tons of pig iron per 24 hr., and also three open-hearth furnaces with a rated capacity of 200 tons per heat.

Harbors and docks in the Ohio River were completed at Weirton and coal handling and screening equipment was installed to take care of up to 400 tons of coal per hour from barges. This coal can be screened and loaded in cars for delivery to other departments at Wierton or may go into the stock pile or direct to the coke ovens.

Loading docks near Brownsville were completed last year which will permit coal to be loaded on barges at that point. This coal is conveyed from the mines of the Weirton Steel Co. to these new docks over three and one-half miles of railroad just completed. The power used in hauling the coal from the mines to the river consists of two gasoline-driven locomotives and necessary coal cars.

The Koppers Co. built 49 Becker type by-product coke ovens. There was also constructed an ore bridge and car dumper for the handling of inbound shipments of iron ore.

For completion during 1927 the company has under construction an open-hearth furnace with a rated capacity of 200 tons per heat.

A new strip sheet steel mill for rolling both wide hot and cold-rolled strip steel is being constructed and will probably be put in operation early this spring. The approximate rolling capacity is 30,000 tons per month.

The docks at Weirton will be completed this year so that raw materials, besides coal, can be taken in. Equipment and warehouses will be constructed which will allow shipment by water of outbound finished products.

The company expects during 1927 to start the construction of a new seamless tube plant with a capacity of approximately 12,000 to 15,000 tons per month.

Wheeling Steel Corporation

The Wheeling Steel Corporation, Wheeling, W. Va., completed the following work in and around its several plants:

Beech Bottom Works: 200-ft. addition to warehouse building.

Martins Ferry Works: Electrification of sheet mill drive.

Portsmouth Works: New storeroom building.

Steubenville Works: Rebuilding No. 2 blast furnace and increasing its capacity from 475 to 750 gross tons per day; one 5-ton open-hearth charging crane; one 125-ton open-hearth ladle crane; new skull cracker runway and crane; one 10-ton tube mill traveling crane and 51 additional Koppers coke ovens.

Work underway at the present time includes the following at various plants:

Benwood Works: New 10-stand 14-in.-12-in. continuous skelp mill and building.

Portsmouth Works: New runout tables, cooling beds, shear and provision of shipping yard for 35-in. blooming mill; one continuous sheet annealing furnace and addition to river coal docks.

Yorkville Works: 22 steel vertical mechanical doubling machines.

Otis Steel Co.

The Otis Steel Co., Cleveland, has under construction an extension to its open-hearth building and one additional 100-ton open-hearth furnace which will be ready for operation early in the year. This company is now constructing an additional 10,000 kw. turbo-generator at its blast furnace power plant. It did a large amount of work during the past year in the way of extensions and improvements, the most important of which are the following:

Blast furnace works: Rebuilt No. 1 blast furnace top and installed new downcomers, dustcatchers and gas mains; installed new domes, platforms, gas and air connections and valve rigs in No. 1 furnace stoves; extended pump pit and installed five new pumping units for supplying additional service and condensing water; extended boiler house and added two 834-hp. boilers; extended power house and installed one 55,000-ton turbo-blower in replacement of two blowing engines and erected a 25-ton traveling crane; added two hot-metal cars; repaired and rebuilt ore dock; installed additional gas booster pump at coke plant; installed new revolving screens at pump house; added new gas washer pump; relined 8 coke ovens, completing relining program starting in 1924.

Steel Division: Installed a 1500-kw. motor generator set, new motors on open-hearth charging machine and new control apparatus on soaking pit valves; erected building for high voltage lines and underground duct to the same; added tar tanks and lines for serving open-hearth furnaces, electric magnet for skull cracker and five additional open-hearth charging cars.

Lakeside Works: Installed feed water heater and boiler house.

Mills Division: Installed revolving screens at pump house; added four electric hoists, new slitting machine, straightening and cutting machine, 15-ton traveling crane, electric tractor, hand trucks and coil racks in cold strip mill; added roller leveler, pin reels, roller conveyors and coil tightening machines in hot strip mill; installed additional pump for sheet mill pickler water supply; relined and overhauled jobbing mills and installed 2000-hp. drive motor for same; installed continuous pickler equipment in its strip mill and new continuous annealing furnace in its sheet mill department.

Jones & Laughlin Steel Corporation

The Jones & Laughlin Steel Corporation, Pittsburgh, completed last year the erection of 122 Koppers-Becker by-product coke ovens and 60 Wilputte by-product coke ovens which were under construction the latter part of 1925. In July last the company purchased the Cincinnati warehouse of the Bourne-Fuller Co. Last August it also completed the erection of two butt weld pipe mills at its Aliquippa Works and also the construction of a coal handling and storage plant at Neville Island, Pa. During the present year the construction of a seamless tube mill has been authorized and engineering work on this undertaking is now under way. At the Aliquippa Works, the company is now building a 9500 hp. powdered coal-fired boiler plant.

Wickwire Spencer Steel Co.

The Wickwire Spencer Steel Co., New York, is installing, at its Buffalo plant, some new steel mill equipment which includes additional ingot buggies, a stripping crane and some soaking pits, as well as a new skull cracker in the scrap yard. The installation of the soaking pits with the stripper and charging machines is to displace two continuous ingot heating furnaces. The pits will have a heating capacity of about 12,000 tons of ingots per month.

Additions to wire drawing equipment along the lines of continuous machinery are being made at the Worcester mills and a new department for the manufacture of card clothing from the improved "Wissco" card wire has been established."

Ludlum Steel Co.

Ludlum Steel Co., Watervliet, N. Y., last year rebuilt and completely equipped with new automatic controls two 10-ton Ludlum type electric steel melting furnaces. There was also built a small electric furnace of standard design to accommodate a special box which will be used for experimentation with a new nitrogen hardening process. This furnace is 110 volt, 80 amperes maximum power input and is automatically controlled with a Brown automatic control pyrometer outside of the box and a recording pyrometer inside the box.

A new chemical and physical laboratory was erected because the old laboratory building was destroyed by fire during the year. The new laboratory is a two story fire proof brick building 32 ft. by 90 ft.

Because the power company which supplies electric current has been changing its system from 40 to 60 cycle, the company has also completed its change to

correspond with the new conditions so that the entire electrical equipment has been revamped and modernized. A new outside sub-station has been built and practically all high tension wires are now underground.

The 10-in. mill drive has been equipped with a Draemer variable speed control having a maximum speed of 240 r.p.m. and a minimum speed of 120 r.p.m. at the mill. Besides this a new 3600 k.v.a. reduction furnace has been installed for taking advantage of surplus power during flood periods.

A new 10-ton capacity electric annealing furnace of the Swindell design has been added to the annealing department and an additional furnace of the same type will be installed this year.

The centerless grinding department has been increased by the addition of two new machines. The company adds that the addition of the two electric annealing furnaces is the beginning of a development which will eventually place the company's entire annealing equipment on an electric basis.

Heppenstall Forge & Knife Co.

The Heppenstall Forge & Knife Co., Pittsburgh, built during the year and put in operation one 18-ton acid open-hearth furnace. It also constructed a new scrap storage yard with bins 60 ft. by 400 ft. complete served by a 10-ton overhead electric crane. A two-story brick store room, 50 x 100 ft., was also constructed. There was also added to the heat-treating equipment six car bottom, automatic control furnaces, 5 ft. wide and 30 ft. long.

John A. Roebling's Sons Co.

The John A. Roebling's Sons Co., at its Trenton and Roebling, N. J., plants, added a new building with equipment for the continuous cleaning of strip steel. Other improvements include wire drawing equipment for the first section of wire mill No. 4, additional tempering furnaces, additional high-speed stranding machines and the rearrangement of machinery and the installation of material handling machinery in the cold-rolling department.

For 1927 general plans have not been determined but improvements thus far authorized are: Completion of a fireproof general store building, the construction of a cleaning house for No. 3 wire mill, additional tempering furnaces, and sprinkling equipment for all major buildings at the Kinkora Works not yet so equipped.

Trumbull Steel Co.

The Trumbull Steel Co., Warren, Ohio, has under construction in its cold strip department a 4-high cold mill which will be provided with a constant tension reel and an automatic cutting off and straightening machine. Cranes will be provided for handling the material. The No. 1 hot strip mill is being rearranged and improved for rolling wider strip than heretofore, by the installation of 4-high mills, new shears, hot reel and bar piling and weighing equipment. A cooling bed 45 ft. wide and 250 ft. long, shears, bar piler and weighing equipment are being installed in the No. 2 hot strip mill. During the past year an additional continuous pickling machine and two double box annealing furnaces were installed in the strip department. In the tin mill department 12 automatic tinning machines with Davis & Poole feeders were installed. These take care of the entire production of tin plate. The first unit of six tin mills were rearranged and six mechanical doublers were installed. There were also erected six Costello sheet and continuous pair furnaces with pair pushers, coal and bar handling equipment and ventilating and man cooling systems, which make this unit of mills moderate in every respect.

Donner Steel Co.

The Donner Steel Co., Inc., Buffalo, N. Y., dismantled its old No. 2 blast furnace and built on the same site last year a new blast furnace of 600 tons daily capacity. In the spring of 1927 a 60,000 cu. ft. turbo-blower will be installed, replacing one of the old type displacement blowing engines.

Central Iron & Steel Co.

The Central Iron & Steel Co., Harrisburg, Pa., last year made several improvements in its plate mills and open-hearth department which were as follows:

A coal transport line about 1200 ft. long has been erected for supplying the 72-in. and 89-in. plate mills and the 42-in. universal mill with pulverized coal.

Two heating furnaces in the 89-in. plate mill have been rebuilt and equipped for burning pulverized coal.

An additional pulverized coal fired heating furnace has been built in the 42-in. universal mill and four producer gas-fired heating furnaces in this mill are being equipped for burning pulverized coal.

A car puller has been installed in the shipping department of the 42-in. universal mill.

A low type charging machine is now under construction in the open-hearth department and will be completed this year.

Central Alloy Steel Corporation

The Central Alloy Steel Corporation, Massillon, Ohio, placed a new blast furnace in operation late last year, the construction of which was started in 1925 by the Central Furnace Co., subsidiary of the Central Steel Co., with which the United Alloy Steel Corporation, Canton, Ohio, was merged under the name of the Central Alloy Steel Corporation. This furnace is 92 ft. in height with a hearth 18 ft. 6 in. in diameter and with a bosh 22 ft. 6 in. Its cubical content is 25,500 cu. ft. It has 10 columns and 10 tuyeres. The large bell is 13 ft. in diameter and the small bell 5 ft. 6 in. in diameter. The rated capacity of the furnace is 600 tons per day. The company now has under construction a battery of 49 coke ovens of the Becker type, which are being installed by the Koppers Co., Pittsburgh. The open-hearth furnaces are being equipped for handling hot metal from the new blast furnace. The company is putting in two new soaking pits at its Massillon steel works and also a battery of waste heat boilers in connection with its open-hearth furnaces at Massillon.

Ford Motor Co.

The Ford Motor Co., Detroit, last year completed and placed in operation its open-hearth plant, construction of which was started the previous year. This has four 100-ton tilting type basic furnaces; space being provided for six additional furnaces. It also completed and placed in operation a 42-in.-32-in. semi-continuous blooming and billet mill and late in December finished the erection of an 18-in. billet and sheet bar mill. The Ford company's steel plant extensions in 1927 will include two units now under construction, a 12-in. spring mill which is expected to be ready for operation June 1 and a 10-in. combination mill for rolling both steel and copper, which is scheduled for completion Jan. 1, 1928. The Ford company last year also installed equipment for making steel by the duplexing process and expects to start the operation of this process during the present month.

Timken Roller Bearing Co.

The Timken Roller Bearing Co., Canton, Ohio, is making extensive additions to its steel making department. A 100-ton open-hearth furnace is under construction and its completion is expected early this year. Extensive additions are being made to the electric furnace melting facilities, two 15-ton furnaces and one 7-ton furnace having been contracted for. Their installation is expected to be completed early this year and this will make this department one of the largest electric furnace melting units in the country, the company already having five 6-ton Heroult furnaces in that department.

Braeburn Alloy Steel Corporation

The Braeburn Alloy Steel Corporation, Braeburn, Pa., installed last year a large bar mill shear. For completion in 1927 the company is now installing two 300 hp. water tube boilers, Detroit stokers, superheaters and soot blowers. It is also installing two new stands, separately driven, for its 10-in. bar mill for rolling

beveled shapes and stainless steel for the cutlery trade. Early this year the company expects to have in operation one 6-ton Niles-Bement-Pond forging hammer which is to be used in the manufacture of tool steel dies.

Universal Steel Co.

The Universal Steel Co., Bridgeville, Pa., completed and put in operation last year the 30-in. x 78-in. two-high reversing roughing and the 32-in. x 44-in. sheet mills which were under construction in 1925. The company has also completed the buildings and is now engaged in installing the equipment for a complete cold-drawn department for the manufacture of cold-drawn bar stock, wire and cold-rolled strips, including new annealing and heat-treating facilities.

Colonial Steel Co.

The Colonial Steel Co., Pittsburgh, installed during 1926 five oil-fired, automatic controlled bar annealing furnaces, each with a capacity of five tons. To house these furnaces and to give additional warehouse and shipping room, a steel frame and brick building 70 ft. x 225 ft. was erected and completed. The electric power system was converted from 25 cycle to 60 cycle by the complete reinstallation of all motors and motor generator equipment, as well as motor driven air compressors in place of the steam compressors.

Bourne-Fuller Co.

The Bourne-Fuller Co., Cleveland, the latter part of the year commenced the erection of a 10-in. bar mill at its Union plant to replace its present 8 and 10-in. mills which will be dismantled. The new mill is scheduled to be ready for operation about April 1. This company now has near completion the construction of considerable electrical equipment at its Upson steel works and blast furnaces. This includes a 4000-hp. reversing motor and a 3600-kw. motor generator set for driving the blooming mill and a turbo-blower with a capacity of 33,000 cu. ft. per min. to replace the steam blowing engines at the blast furnace. A 4000-kw. turbo-generator is also being installed. At the blast furnace a Bartlett-Haywood gas washer is being erected.

Corrigan, McKinney Steel Co.

The Corrigan, McKinney Steel Co., Cleveland, late last year completed and placed in operation the first unit of a finishing mill department, a 10-in. merchant bar mill, and is now erecting a 12-in. bar mill which will be ready to start early this year. This company last year also increased its semi-finishing steel capacity by completing the construction of a 22½-in.-18-in. continuous sheet bar mill. This supplements its 21-in.-18-in. mill on which both billets and sheet bars had been rolled and which is now used exclusively for making billets. Two additional 21-in. stands were added to the billet mill which now has six 21-in. and six 18-in. stands. A 9000-hp. synchronous motor was built to drive the sheet bar mill.

Columbia Steel Corporation

The Columbia Steel Corporation, San Francisco, recently acquired the sheet mill at South San Francisco known as the Pacific Sheet Steel Corporation and formerly owned by the Metal & Thermit Corporation. This is an 8-stand mill with an approximate capacity of 36,000 tons of sheets per year ranging from 8 to 30 gage. The corporation is also part owner of the recently constructed plant of the Pacific States Cast Iron Pipe Co., at Provo, Utah, having a capacity of 50 tons per day of soil and pressure pipe. This plant is owned and operated by the Columbia Steel Corporation in conjunction with the McWane Cast Iron Pipe Co. of Birmingham, and it will produce McWane patent pre-calked pressure pipe as well as soil pipe and fittings for the intermountain states and the Pacific Coast markets.

The Midvale Co.

The Midvale Co.,, Nicetown, Philadelphia, made the following improvements to its plant last year: A new coal powdering and distributing unit was installed, the use of powdered coal as a fuel having been extended to the company's boiler house and additional heating furnaces. New equipment has been installed for producing and machining large forgings up to 200 tons in weight. New waste heat boilers have been installed at the heating furnaces in the forging plant. The company's program providing machine tools with individual electric motor drives has been extended and is being continued to completion. An improved type of reversing valves has been installed at two of the open-hearth furnaces.

Other Steel Works Additions

The Wisconsin Steel Co., Chicago, put into operation in August last year a new combination universal and cross country mill of 12,000 tons monthly capacity, electrically operated.

The Jessop Steel Co., Washington, Pa., extended last year its bar mill department, its crucible melting building and its electric furnace department, including some additional equipment.

Pittsburgh Steel Co., Pittsburgh, last year installed and put in operation a Pilger mill for the manufacture of seamless tubes 6 to 12 in. in diameter. A description of this mill appeared in THE IRON AGE of Sept. 23, 1926.

The Columbia Tool Steel Co., Chicago Heights, Ill., added to its equipment one 8000-lb. steam hammer complete with heating furnaces, cranes, etc., last year. It also built two 5000-lb. capacity electric heat-treating and annealing furnaces.

The Phoenix Horse Shoe Co., at its Cleves, Ohio, plant installed and put in operation last year a 6-ton Heroult electric furnace. This furnace was one which was formerly located at the plant of the Hunter Crucible Steel Co., Cleveland. The company plans to use this furnace to produce steel, not only for its own consumption but to be in a position ultimately to furnish high-grade steel to the trade.

The Columbia Steel Co., Butler, Pa., has enlarged its steel ingot capacity by increasing the size of its open-hearth furnaces from 60 tons rated capacity to 100 tons. A 36-in. hot strip sheet mill with a monthly capacity of 30,000 tons has been completed and placed in operation. Steam is being replaced by electric power for driving the 34-in. slabbing mill.

Sheffield Steel Corporation, Kansas City, Mo., erected and put into operation a new 65-ton open-hearth furnace in November, last year, but no further additions or expansion this year are contemplated.

The Gulf States Steel Co., Birmingham, Ala., put in operation at Alabama City in March last year a 12 and 9-in. electrically driven bar mill with an 18-in. roughing stand.

The Latrobe Electric Steel Co., Latrobe, Pa., installed last year six stands of 10-in. bar mill for rolling stainless steel.

A 9-in. bar mill for rolling alloy steels was installed by the Crucible Steel Co. of America at its Park Works, Pittsburgh, and an 18-in. and a 12-in. merchant mill, together with auxiliary equipment was put in by the Pittsburgh Crucible Steel Co. at Midland, Pa.

Blast Furnace Construction

THE year 1926 was featured by the completion of several new furnaces, leaving very few planned as additions to capacity. Rebuilding and enlargement of old furnaces were numerous. The chief events last year were as follows:

The Hudson Valley Coke & Products Corporation, Troy, N. Y., late in March last year blew in its new 500-ton blast furnace, which has been in constant operation ever since. The by-product coke oven plant, consisting of 55 ovens, together with plants for the recovery of sulphate of ammonia, tar, benzol, phenol, etc., was completed and put in operation last October.

The Pulaski Iron Co., Philadelphia, completed the installation at its blast furnace at Pulaski, Va., of copper cooling plates in the lining of the furnace.

The Inland Steel Co., Chicago, early last year put

into operation a new blast furnace, a description of which was published in THE IRON AGE, May 20, 1926.

The Mystic Iron Works, Everett, Mass., completed last year its new blast furnace which was blown in late in September. A description of this plant appeared in THE IRON AGE, Nov. 4, 1926.

The Clinton Iron & Steel Co., Pittsburgh, installed last year a modern crushing and screening plant to take care of its slag. There is now under construction a dock, together with the necessary hoists and conveyors, to permit the company to obtain its coke supply by river and also to make it possible to ship pig iron or any of the company's products by river.

The Shenango Furnace Co., Pittsburgh, last year completely relined its No. 1 blast furnace as well as the stoves and is building a fifth stove at No. 3 furnace.

The St. Louis Coke & Iron Corporation, St. Louis, last year completed the construction of its second 600-ton blast furnace. This furnace was blown in Oct. 14.

The American Rolling Mill Co., Middletown, Ohio, will start the construction this year of a 400-ton blast furnace at its Ashland, Ky. plant. Contract for this work has been awarded to the Freyn Engineering Co., Chicago.

The Reading Iron Co., Reading, Pa., relined and repaired its Keystone furnace last year. It has a daily capacity of 352 tons. Its last run was for almost 26 months when it was shut down last May. A complete sintering plant has been installed for treating the company's concentrated ore from its Richard mine near Wharton, N. J.

Additions Made to Rolling Mills

THE West Leechburg Steel Co., Pittsburgh, rebuilt and electrified last year its 9-in. hot strip mill which includes six continuous roughing and four finishing stands. There was added to this department one Chapman-Stein continuous heating furnace. There was also added last year three gas producers and two 10-in. cold mills to the finishing department.

The Rockaway Rolling Mill, Rockaway, N. J., purchased last year the plant formerly operated by the International High Speed Steel Co. located at that place. The Rockaway company is reconstructing it. The equipment consists of a 4-stand 12-in. mill, a 6-stand 10-in. mill and a single-stand 10-in mill, the last two in tandem and all electrically driven. The plant will be in production some time this year and the company expects to turn out 4000 tons per month when it puts in continuous furnaces. The products will be deformed reinforcing bars and rail carbon steel angles.

The Delaware Seamless Tube Co., Auburn, Pa., early last year put into operation an automatic German pilger mill which replaces its previous hand mill for swaging pierced billets into the form of hot finished tubes. This mill produces tubing with a maximum outside diameter of 3½ in. The motor equipment is a steam engine about 250 h.p. A full description of this mill appears in THE IRON AGE of March 11, 1926.

The Republic Rolling Mill Corporation, Chicago, with mills at East Chicago, Ind., last year put into operation an 8-in. mill for making rounds and squares from ⅝ in. to ¾ in., flats from ¾ to 3-16 in. up to and including a maximum of 1 by ¼ in.

The Acme Steel Co., Chicago, with plants at Chicago and Riverdale, Ill., put into operation last year a new hot strip mill with 20-in. roughing rolls and 16-in. finishing rolls, 14 stands in all, to roll all sizes from 3 in. to 20 in. strip. This mill was described in THE IRON AGE, July 8, 1926. For the company's cold rolling plant five additional annealing ovens were built.

The Tyler Tube & Pipe Co., Washington, Pa., in 1927 will convert another of its lapwelded boiler tube furnaces into a lapwelded pipe unit, capable of making pipe from 2 in. to 6 in. in diameter.

The Transue & Williams Steel Forging Corporation, Alliance, Ohio, last year erected an addition to its forging plant 80 ft. x 240 ft. and installed a 425-kw mixed pressure turbine, an 18,000-lb. drop hammer and a 6-in. cold saw.

The Michigan Steel Corporation, Ecorse, Detroit, last year completed one 46-in. sheet mill of the Mesta type with a capacity of approximately 8000 tons per year. This mill was added to the train of rolls previously operating. This company now has under construction another 46-in. mill of the Mesta type with a similar capacity, which will also be added to the present hot mill train.

The Empire Steel Co., Cleveland, during the past year erected a new boiler plant and equipped its annealing furnaces for burning fuel oil. A 160,000-gal. fuel oil storage tank was erected.

Extensions to Foundries

IMPROVEMENTS and additions to steel, iron and other foundries last year or contemplated for this year are related in the following paragraphs. Increased capacity for producing ingot molds is a feature.

Valley Mold & Iron Corporation

The Valley Mold & Iron Corporation, Sharpsville, Pa., completed last year and put into operation a new ingot mold foundry in South Chicago with a capactiy of approximately 20,000 tons per month. Hot metal for this foundry is received from the Federal blast furnaces of the By-Products Coke Corporation. For construction and completion during the first half of this year the company has started a new ingot mold foundry at Hubbard, Ohio, with a capacity of 25,000 tons per month. Hot metal for this plant will be received from the Youngstown Sheet & Tube Co.'s furnaces adjacent thereto.

Nugent Steel Castings Co.

The Nugent Steel Castings Co., Chicago, reports that the chief addition to its plant last year was the installation of new sand handling equipment which was described in THE IRON AGE, Sept. 9, 1926. At present the company is completing the first unit of a rather extensive development which it is expected will provide considerable in the way of new facilities. This consists of a sub-station for the housing of the power company's equipment, as well as a building to house the air compressors, motor generator sets, distributing panels, etc. This sub-station has been built in accordance with the Commonwealth Edison Co.'s designs.

Other Foundry Improvements

Eagan-Johnson Steel & Iron Co., Crum Lynne, Pa., made several additions to its main foundry building and other departments, increasing the capacity to 600 tons per month. The main foundry building was increased by 120 ft. and a wing 85 x 200 ft. was added for annealing and cleaning departments. A brief description of some of the improvements was published in THE IRON AGE, Dec. 2, 1926.

The Otis Elevator Co. installed and put in operation this year a second 3-ton Moore electric steel furnace.

The Lebanon Steel Foundry, Lebanon, Pa., expects to erect this year a new pattern storage, 50 x 50 ft. and three stories high.

The Reading Steel Casting Co., Reading, Pa., completed the installation last year of the 7-ton Edmoore basic electric steel furnace which it is now operating.

The Deemer Steel Casting Co., Newcastle, Del., installed last year one No. 33 type L-1 Pangborn sand blast room and also one No. 3 type GH-1 Pangborn sand blast barrel. With this equipment goes, of course, the dust arrester and everything to make two complete units.

The Riverside Steel Casting Co., Newark, N. J., added last year to its equipment a large mold drying oven, 10 x 24 ft. and an adequate sand mill.

The Atlantic Steel Casting Co., Chester, Pa., last year added approximately 20 ft. to its open-hearth platform and placed thereon a charging machine. Contracts have also been recently let for a new cleaning room, approximately twice the size of the present one, which should be completed during the first quarter of this year.

The Crane Co., Chicago, is completing a large extension to its main plant and has under way considerable building work for this year. Among these are additions to the works office building and small extensions to some of the factory units. Besides this the company will build three or four branch house buildings calling for the expenditure of possibly $500,000 to $600,000.

The Detroit Steel Casting Co., Detroit, last year installed a 1½-ton Moore electric furnace and took out its converters.

The Bettendorf Co., Bettendorf, Iowa, has nearly completed a new office building which will be occupied early this month. It is a three-story and basement building 77 ft. x 140 ft. The total cost was approximately $275,000.

In Canada

The Steel Co. of Canada, Ltd., Hamilton, Canada, completed last year at its Hamilton Works a McKee-Greenawalt sintering plant and installed one Heyl & Patterson coke screening station. During the present year the following new construction has been authorized or is under way:

At the Hamilton Works: Extension to sheet mills, 3 additional stands of hot rolls for annealing and heating furnaces, and additional cold rolls for overhead cranes, etc. One galvanizing department with two pots and equipment; extension to the rod and bar mills with patenting furnace; one McKee gas washer and 16 steel ore bins at the blast furnaces.

At the St. Henry Works: one crane runway over the yard extending to the wharf.

At the Swansea Works: an extension to forge and track bolt departments at the bolt works, Toronto.

Expansion of Electric Melting Capacity Large

REAL progress in increasing the electric furnace steel and iron melting capacity of the country was made in 1926. Unfortunately, as in 1925, so also in 1926 the situation regarding the securing of detailed information concerning the contracting for and the installation of new furnaces is unsatisfactory. Only general facts are available.

Large Installations in 1926

The data collected from companies selling electric melting equipment show another splendid record nearly duplicating that of 1925, which was the best since the war. The 41 furnaces sold in 1926 compares with 43 in 1925. The details for the United States, as reported by the selling companies, are as follows:

Type	No. Installed or Contracted for
Moore (or Pittsburgh)	18
Heroult	11
Swindell	5
Van Baur	3
Greene	2
Kay	1
Oakland	1
Total	41

In most cases, and even to a greater extent than in 1925, companies to which these furnaces have been sold are not divulged.

As in 1924 and in 1925, the feature last year was the large business done by the Pittsburgh Electric Furnace Corporation. Its sales are reported as 18 furnaces for 1926, comparing with 26 in 1925 and 24 in 1924. The company states that, with the 6 furnaces sold in foreign countries, its 1926 sales amounted to 24 furnaces. The company's total in the United States is now 147. With the 15 furnaces credited to foreign countries, the world total for this type is represented as 162.

The sales of Heroult furnaces by the American Bridge Co. of the United States Steel Corporation were as follows in 1926:

Three (3) of 25-ton capacity; two of 15-ton capacity; two of 7-ton capacity; two of 3-ton capacity; one of 1-ton capacity, and one of ½-ton capacity.

William Swindell & Brothers, Pittsburgh, state that 5 furnaces were manufactured and sold last year. The smallest was 3 ft. in diameter and the largest 11 ft. 6 in. Three of the furnaces are basic and two are acid.

The Greene Electric Furnace Co., Seattle, Wash., reports the distribution of 4 furnaces last year as follows:

Wallace Foundry Co., Ltd., Vancouver, B. C., one 5-ton furnace for both steel and cast iron; Riverside Iron Works, Ltd., Calgary, Alberta, Canada, one 1½-ton furnace for steel and cast iron; Leach Brothers Iron Works, Seattle, Wash., one 1½-ton furnace for steel and gray iron and one 200-lb. furnace for the foundry of the University of Washington for making steel and iron castings.

Albert E. Greene, president of the company, reports that in making synthetic electric cast iron the time of carburizing the metal has been materially cut down, and the new electric cast iron with less carbon than cupola iron gives greater strength and excellent qualities.

The president of the Kay-Brunner Steel Casting Co., Los Angeles, Cal., reports the building of another Kay furnace for installation in the company's foundry. The plan is under contemplation of building another furnace for the company's steel wheel plant in Alhambra.

The Oakland Steel Foundry Co., Oakland, Cal., is reported to have built a 1-ton acid furnace of its own design for use in its own plant.

One of the largest installations of electric steel melting equipment in the country will be that at the plant of the Timken Roller Bearing Co., Canton, Ohio, when the two 15-ton and one 7-ton furnaces are added to its present battery of five 6-ton Heroult furnaces.

Each year records constant changes in the location of various furnaces because of sales from one company to another. This has been particularly the case in the last three or four years.

Summary

The record of expansion, as presented by the annual review issues of THE IRON AGE for the last few years, or since the industry started, has been in accordance with the following table:

Period	New Furnaces	Period	New Furnaces
July, 1913, to Jan. 1, 1915	22	1920	23
1915	32	1921	32
1916	63	1922	18
1917	97	1923	33
1918	54	1924	40
1919	36	1925	43
		1926	41

Sales in 1926 to American users were therefore the second largest since the war. The data in the table call for 544 furnaces as of Jan. 1, 1927. There has been considerable scrapping or abandoning of various types of furnaces in the last few years. If liberal allowances are made for these as well as for some sales not made public, a conservative estimate would place the total number of electric furnaces in the American steel industry at a little over 500. The Heroult leads with the largest total about 190, with the Moore furnace second at close to 150.

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Looking Into 1927

AFTER two years of record-breaking production, men in the steel trade are not disposed to predict a third that will top them both. They recall that 1925 as well as 1924 ended with an up-swing in mill operations, whereas the production curve turned downward last October and is not likely to show a marked reversal in the immediate future.

It is fair to say that the scale of activity in 1926 was larger than leaders in the industry looked for as the year opened; larger too than most of them were willing to predict at the end of the first six months, that being the point at which all the January prophets of prosperity had drawn the line. The fact that the course of steel production has so often served to exemplify the more commonly charted phases of the business cycle may have been an element in cautious estimates for 1926, as it is now in the more conservative predictions for 1927.

The better analysis steel producers are now able to make of a year's business before another year has fairly started, as exemplified in this issue of THE IRON AGE, is the basis of some of the expressions already current concerning sources of demand in the coming year. The unprecedented record of the oil industry as a consumer of steel last year has led to a more moderate appraisal of that factor for 1927. Also because of recent signs, by no means pronounced, of slackening of new construction and the building of automobiles, expectations for those lines are somewhat less than prevailed at the opening of 1926.

In railroad consumption the promise for 1927 is highly favorable. Track laying bids fair to equal the exceptional record of 1926, and after a very lean year in car and locomotive building and a low average for the three years, 1924-26, equipment builders are finding substantial ground for their hopes of the year just begun.

So far as the steel industry itself is concerned its record in 1926 leaves it with no handicaps in meeting the demands of the new year. Its outputs per unit of plant were the highest ever reached. Instead of making further enormous capital outlays in the creation of new plant, it increased the efficiency of existing plant by expenditures for improvements, carrying further the work done in this direction in 1925. There is evidence also of progress in the development of better sales policies, so that, while there is no early likelihood of advances in prices, the maintenance of a fairly stable market, even with some lessening in volume, is to be expected.

While imports of foreign steel will not be a serious factor in 1927, a further gain like that of last year (from 232,000 tons of finished steel in 1925 to about 390,000 tons) would not be surprising. The caveat served upon German exporters in the anti-dumping activities of our Treasury Department last year may act as a deterrent, but more light is awaited as to the policy of the European steel cartel. With Great Britain again vigorously in the export field, Germany and other members of the cartel will have more incentive to turn upon this market a capacity that operated last year on business British mills could not take.

What is said above of the steel industry must be taken as subject to the influences that will determine the course of all business. The plentiful reviews of the economic situation have been dwelling for months upon the gradual decline in commodity prices due to Europe's struggle to get on a gold basis and in part to management pressure for high output to cut cost; upon the continued ease in credits, and the high purchasing power of well-employed labor. These and other familiar factors reappear in current comment upon the outlook for 1927, and in general favorable deductions have been warranted. At the same time there is no blinking the existence of untoward influences, such as the too abundant extension of credit and the large proportion of the national income devoted to unearned luxury—factors, however, with which the reckoning may yet be postponed beyond the New Year.

American Steel 54 Per Cent of All

A NOTABLE record was made by the world's steel works in 1926. At 89,500,000 gross tons a new high mark was reached, as told in detail in the article beginning at page 50. Again the pre-

dominance of the United States is emphasized, this country producing 7,000,000 tons more than all the rest of the world. At 48,250,000 tons (ingots and castings) the American output was 54 per cent of the total. In 1925 it was 52 per cent and in 1913, when world production was 74,835,000 tons, only 42 per cent.

For the first time since the war the exports of the six leading producing nations were larger than in 1913. It has taken eight years, therefore, for the so-called "world hunger for steel" to grow to pre-war proportions. At 17,420,000 tons last year the total exports of the United States, Great Britain, Germany, France, Belgium and Luxemburg were 7.5 per cent above the 16,197,600 tons exported in 1913. The gradual economic and financial recovery of consuming nations has been asserting itself.

Again pig iron lags. Although a new post-war record was made at 76,663,000 tons in 1926, the total was 800,000 tons less than the 77,480,000 tons made in 1913, whereas 1926 steel production exceeded that of 1913 by 15,000,000 tons. In pig iron as well as in steel the United States more than equals the rest of the world, our 39,500,000 tons of pig iron having been over 51 per cent of the total last year. The American proportion was 49 per cent in 1925 and only 40 per cent in 1913.

Where the Steel Went

STATISTICS of the distribution as well as production of steel in 1926 were obtained for this issue of THE IRON AGE from mills producing nearly three-fourths of what is estimated as last year's output. Production figures alone, classified according to the forms of steel, were supplied by makers of 93.3 per cent of the total. Such full cooperation, typical of the steel industry, is highly gratifying, for the task of compiling is prodigious in most cases and the work calls for dispatch.

With such high percentages of returns deductions as to the missing data do not have to be sheer guesses. And in that connection we now express the hope that producers will respond in future to a somewhat more extended classification of steel uses, seeing how valuable the figures can become in laying out sales and production policies, when the classes of buyers are more clearly defined.

The comprehensive character of the distribution of last year's output by form of steel and class of consumer is shown by the table extending over pages 8 and 9. In addition to the information there given on shipments made by 27 companies, there were supplied also, without consumer distribution, the amounts of finished and semi-finished steel made by 21 companies.

One point that stands out is the lower position of the railroads as the steel trade's most important customer. An estimate of the shipments of the entire steel trade, while leaving the railroads still at the top of the list, makes the railroad percentage between 21 and 22 and building construction only 2 points lower. Railroad buying has been less in recent years than generally believed. In previous analyses of the subject we have handled the calculations in the light of the large railroad patronage of many of the companies reporting; but the higher ratio of returns at this time reduces the opportunity for error in adjustments.

It is to be remembered further that a much higher percentage of the output of such products as plates and shapes is heard from than in the case of sheets or bars, for example. A better line than usual was afforded in this year's compilation, however, because of full reporting of sales of semi-finished steel.

Going back to the proposal for more detailed information in the future: It is our belief that companies would be willing to segregate shipments according to groups of customers and would find it easier actually so to do. Then it would be a matter of reallocation, fraught with some difficulties of course, to get a redistribution in terms of the major channels of consumption. There are large buying companies which in turn serve the major industries—to mention boiler makers and electrical machinery manufacturers—and such shipments are likely under the present method of reporting to go in the miscellaneous class, which is now rather too large to be of great service.

THE IRON AGE congratulates the industry on the results of the fine cooperation it has given in this work and on its broad view of this and other efforts that for years have made American iron and steel statistics easily first in completeness and accuracy.

Trends in Iron and Steel Manufactures

STUDIED over a series of years, returns of production of various forms of iron and steel entering into manufacture show clearly defined tendencies. In most such cases there is an increasing use of the material, in some at a much more rapid rate than in others. Several outstanding cases are covered in the diagrams and explanations on other pages.

Many of the items studied are not reported in tonnage. Among them are buildings (floor area), foundry equipment, steel furniture and steam pumps (dollars), mechanical stokers (horsepower), and electrical energy (kilowatt-hours). For others, reported by numbers, a tonnage figure may be estimated. This group includes locomotives (figured at 100 tons of iron and steel), freight cars (12½ tons), passenger automobiles (1¼ tons), motor trucks, buses, etc. (2½ tons), enameled bathtubs (400 lb.) and steel barrels (65 lb.).

Annual changes shown in the several trend lines are mostly ascending; railroad equipment, mechanical stokers and industrial buildings are the exceptions in a list of about thirty. Those items which may be evaluated in tons of iron and steel appear to have a (net) upward tendency at the rate of some 1,000,000 gross tons per year. To this total the automotive industry has contributed above 40 per cent.

Fluctuations from month to month, no less than in the averages from year to year, will show wide divergences from the "normal" established by the trend line. And, as further experience accumulates, a change in the trend line slope may be suggested. But for the near future its indications

should, in general, accord well with observed facts. It is at best a guide, rather than a prediction—a probability, rather than a definite measure of what is to come.

Transportation Demands Quality Metals

HOW many of us remember the "ice wagon" of 30 years ago? Those first bicycles were fittingly so named, for the early manufacturers were thinking more of the endurance of the machine than of the endurance of the rider. It did not take them long to discover, however, that a lighter, more easily pedaled wheel would sell rapidly at a higher price. Consequently in the days when the bicycle was really exploited we had glowing advertisements of feather-light wooden rims and handle bars. Advanced metallurgy also had its part in providing drawn seamless tubing for the frame and heat-treated parts for ball bearings and sprocket chains.

The relationship between engine power and gross weight was strikingly apparent in bicycles, because muscular energy must be used with the utmost economy if the man is to get much enjoyment out of the process. Automobile manufacturers, on the whole, have grasped the general principle demonstrated by the bicycle's evolution. Of course the 1927 models are far more efficient than their forerunners of 1907. Rising cost of gasoline and tires and the demand for high speed have all been responsible for the more economical use of material.

A pronounced deterrent is apparent in motor car design, however—the demand for comfort. A car must not be too light if it is to ride smoothly over our present highways at a good speed. Despite this counter influence, however, the automotive and aircraft engineers have demonstrated to the entire transportation industry what may be done with reducing the weight, increasing the power and using the fuel efficiently. While the gas engine is the fundamental factor in this development, every one knows how essential has been the part of heat-treated alloy steels and aluminum alloys.

A similar trend is observable in marine transportation. Within the last 15 years, sufficient advance has been made in the ships' engine and boiler rooms so that in the same area and for the same weight the turbines now develop twice the power. In battleships the urge for weight economy is especially insistent. With limitation of gross displacement fixed by the Disarmament Treaty, it is necessary to save every pound in the hull and engine rooms so the ship can mount the heavy guns required for combat.

The surprising savings in weight in the propulsion machinery has not been due so much to refined design or high-strength steels as to the use of fuel oil, and of large boiler units working at high pressure and superheat. But it is obvious that such enormous concentration of energy would be impossible without a corresponding advance in the quality and trustworthiness of metal going into boiler drums, boiler and condenser tubes and the pipe, valve and turbine details.

While a similar decrease in the dead weight of railroad rolling stock has not been so obvious, nevertheless this has been going on all the time. Here it has been effected by increasing the payload capacity of the individual units faster than the dead-load. So much has been done in this respect that the limitations fixed by the standard gage and bridge clearances have almost been reached. Now we hear that master car builders are turning to the less obvious refinements, such as roller bearings and light-alloy superstructures.

So brief a review shows that the entire transportation industry has been driven by the trend of the times to accept the principle so quickly demonstrated by the bicycle. It might be stated in several ways: "Drive down to the minimum that proportion of the total power used to haul dead weight." "Decrease the ratio of dead load to live load." "Economize in the weight of moving masses." However stated, the principle remains the same, and will take years for the transportation industry as a whole to apply it to its economic maximum.

During those years we see nothing but continued development and increased tonnage of special alloys, heat-treated steels, and high-strength metals.

The Scrap Merchant's Year

WHILE not a few producers and merchants in or associated with the iron and steel trades find the past year has not been particularly bountiful in profits, the scrap dealers strongly assert that it was not a good year for them. Inasmuch as the turnover in scrap increases from year to year, such a situation calls for consideration.

Both the output and consumption of scrap in 1926 were larger than in any previous year. The immediate or superficial cause of the lightness of margins between dealers' buying and dealers' selling prices was the double competition, in sales and in purchases. Time after time a dealer would make a sale into consumption at a price promising some profit, only to find that almost as high if not fully as high prices had to be paid for small lots, to be assembled into large lots, as were being realized.

Going a trifle deeper into the matter, it was seen that dealers were disposed to do business on no margin or on an insufficient margin, rather than not do business at all. Each dealer had his organization and wished to keep it busy. Our general theory is that any line of business insures profits in the long run or people get out of it. In the case of scrap the human element enters. The business is rather an alluring one, having certain apparent promise of profit. It does not seem attractive to all men, but men are different.

As to its profitableness, the scrap trade has been undergoing great changes in its circumstances. First, the swings in the rate of scrap consumption have been greatly reduced. Steel mills now operate much more steadily than formerly. Fluctuations in the volume of demand for scrap are greater than fluctuations in the rate of mill operations, for the reason that when operations at a mill decrease the mill is reducing its own floating supply of works scrap, while when a mill's operation is increasing it is not yet producing so much works scrap as it will with the higher rate established.

Second, with affairs steadier all around, both originators of scrap and consumers have more definite and firmer views as to values. Originators resist declines and consumers resist advances. The old practice of dealers filling their yards at one time and clearing them off at another has been practically eliminated, market prices not swinging sufficiently.

The last full movement of this sort was completed nearly four years ago. Since then there has been little opportunity, and fluctuations in dealers' yard stocks have been chiefly of the scrap the yards themselves produced, as a manufacturing operation in preparing scrap that had to go through a yard process. This yard scrap cannot fluctuate much in value, for in a time of light demand dealers pay good prices for material in order to keep their yards engaged.

When the effects of these and other changes have worked themselves out the scrap trade presumably will find itself again. Some dealers may be forced out, leaving more business for the survivors. There will always be a big scrap trade and it is not reasonable to think that it will not in the long run afford profits more in line with the costs and risks involved.

New High Peak in American Steel

(*Concluded from page 5*)

tween these furnaces and the producers in eastern Pennsylvania and at Buffalo, Charlotte and Port Henry, N. Y.

IMPORTS DECLINED IN LAST QUARTER

Receipts of foreign iron dwindled in the last three or four months of the year, due to higher prices abroad and lower prices here, together with the determination of the new Eastern producers to shut off foreign iron wherever possible. Another factor was that the railroads made higher demurrage charges on cars used for the shipment of foreign iron from incoming vessels, and this revision made it extremely hazardous for importers to bring in iron on speculation. Germany was the largest shipper to the United States in 1926, having sent about one-third of all of the iron that came in, while in the previous year India was in first place. Data on the pig iron shipments from European countries are given on a preceding page in the paragraphs dealing with imports.

ONLY 40 MERCHANT FURNACES GOING DEC. 1

Comment was made in our review of a year ago on the difficult position in which many merchant furnaces were placed, and in no respect has the situation changed in the past year. Of the 213 blast furnaces which were active on Dec. 1 only 40 were engaged in merchant production, not counting those making ferromanganese or spiegeleisen. This is 10 less merchant furnaces than were in blast on the same date in 1925. The Alabama district is in a particularly advantageous position. Having low ore and fuel costs and having had a fairly stable market throughout the year, the Southern furnaces are profiting by the increasing consumption of iron in the South, whereas in former years they had to depend to a considerable extent on Northern markets for a share of their business.

PRICES ON A LOW LEVEL

Prices for pig iron were fairly steady throughout the year. In the second and third quarters there was a slight decline from the levels of first quarter, then a slight bulge came in October, when higher coke prices, due to a large coal demand from Great Britain, together with an increasing pig iron demand from consumers, caused producers to be more conservative in selling. An advance of $1.50 took place in eastern Pennsylvania, but the greatest rise in any other district was 50c., and some prices did not change at all. A part of the advance in eastern Pennsylvania was wiped out when competitive conditions reasserted themselves after the ending of the coke flurry produced by the British strike.

Some rather striking changes in competitive situations developed during the year. Cleveland iron was moved to Chicago by water, one purchase amounting to 15,000 tons. Buffalo iron entered the Detroit market also by water, and Cleveland and Toledo iron was rather an important factor in and around Cincinnati, where Birmingham iron and that made in southern Ohio have generally had full sway. Buffalo furnaces, meeting more competition in New England than ever before, turned westward for markets and at times invaded districts where Cleveland, Valley or western Pennsylvania iron has had the advantage. The result of this was that Buffalo iron was frequently sold for shipment out of its district at $1 or more a ton below the prices quoted to consumers nearer at hand. The highly competitive conditions in New England have virtually crowded eastern Pennsylvania iron out of that market just as Virginia iron met the same fate a few years ago. Of the 17 furnaces in Virginia only one has been operated continuously on pig iron; another has made ferromanganese a part of the time, while the remainder were idle.

An illustration of the low prices of the year is the quotation of $17.50 on basic iron at Valley furnaces in midsummer, the lowest point reached on that grade since 1915.

BRITAIN RESUMES RAPIDLY

About 50 Furnaces in Blast—Steel Plant Idle 15 Months Is Reopened—Prices Tending Toward Normal

(*By Cable*)

LONDON, ENGLAND, Jan. 3.

PIG iron is quiet and prices easier as production increases. No. 3 Cleveland has been offered on three to six weeks delivery for £4 2s. 6d. ($20.00) per ton and on January delivery at £4 5s. ($20.61) per ton. There are 38 Northeastern furnaces in blast and probably 50 furnaces are active throughout the United Kingdom. Foreign ore continues dull.

Finished steel is strong and some plate makers are asking £8 15s. per ton (1.90c. per lb.) f.o.b. with August the earliest delivery. Others, however, are still selling down to £8 per ton (1.74c. per lb.) f.o.b.

The raw material and fuel scarcity is still hampering expansion of production. There is a small export demand but little business is being booked as makers' order books are well filled. Baldwins' Ltd., has resumed operation of the Port Talbot Steel Co., Port Talbot, after 15 months inactivity. The plant has 11 open-hearth furnaces and plate, rail and bar mills.

Sharp Drop in December Iron Output

Daily Rate Declined 8178 Tons or About 7.5 Per Cent from November—Net Loss of Nine Furnaces—Ferromanganese Output Largest Since the War

A SHARP drop took place in the December production of pig iron. Data collected largely by wire on Jan. 3 show that the daily rate for December of 99,712 gross tons was 8178 tons or about 7.5 per cent less than the daily rate of 107,890 tons per day in November. The December rate was the first one to fall below 100,000 tons per day last year.

The production of coke pig iron for the 31 days of December was 3,091,060 tons or 99,712 tons per day as compared with 3,236,707 tons or 107,890 tons per day for the 30 days in November.

The output of coke pig iron for 1926 was 39,070,470 tons which compares with 36,403,470 tons in 1925 and with 40,059,308 tons in 1923, the record year. When charcoal iron and ferroalloys are added to the December total of 39,070,470 tons, the 1926 production will approximate 39,500,000 tons.

There was a net loss of 9 furnaces during December, 4 having been blown in and 13 shut down. In November the net loss was 6, with a net gain of 4 in October.

On Jan. 1 there were 204 furnaces in blast as compared with 213 on Dec. 1. The estimated daily capacity of the 204 furnaces active on the first day of January was 98,860 tons as contrasted with 105,850 tons per day for the 213 furnaces in blast on Dec. 1. Of

Daily Rate of Pig Iron Production by Months—Gross Tons

	Steel Works	Merchant*	Total
December, 1925	81,552	23,301	104,853
January, 1926	83,867	23,107	106,974
February	81,148	23,260	104,408
March	85,841	25,191	111,032
April	89,236	25,768	115,004
May	86,682	25,622	112,304
June	82,186	25,658	107,844
July	79,392	24,586	103,978
August	78,216	25,025	103,241
September	81,224	23,319	104,543
October	83,188	24,365	107,553
November	82,820	25,070	107,890
December	74,909	24,803	99,712

*Includes pig iron made for the market by steel companies.

Pig Iron Production by Districts, Gross Tons

	Dec. (31 days)	Nov. (30 days)	Oct. (31 days)	Sept. (30 days)
New York and Mass.	210,243	218,657	224,631	211,362
Lehigh Valley	88,182	97,722	89,804	77,523
Schuylkill Valley	65,283	64,716	69,221	65,101
Lower Susq. and Lebanon Valleys	48,537	47,413	36,639	35,545
Pittsburgh district	645,592	682,246	728,650	688,000
Shenango Valley	96,732	93,466	109,450	96,841
Western Penna.	105,996	118,005	134,104	130,219
Maryland, Virginia and Kentucky	88,488	87,659	90,117	84,172
Wheeling district	128,077	111,166	109,241	105,391
Mahoning Valley	281,275	316,586	342,437	329,488
Central and Northern Ohio	321,684	347,547	345,124	333,951
Southern Ohio	42,892	50,757	43,843	38,082
Illinois and Indiana	557,064	568,312	602,672	576,506
Mich., Minn., Mo., Wis., Colo. and Utah	151,468	150,981	152,615	127,860
Alabama	252,932	274,604	249,584	230,345
Tennessee	6,615	6,870	6,000	5,907
Total	3,091,060	3,236,707	3,334,132	3,136,293

Daily average production of Coke and Anthracite Pig Iron in the United States by Months Since Jan. 1, 1922—Gross Tons

	1922	1923	1924	1925	1926
Jan.	53,063	104,181	97,384	108,720	106,974
Feb.	58,214	106,935	106,026	114,791	104,408
Mar.	65,675	113,673	111,809	114,975	111,032
Apr.	69,070	118,324	107,781	108,632	115,004
May	74,409	124,764	84,358	94,542	112,304
June	78,701	122,548	67,541	89,115	107,844
½ year	66,578	115,147	95,794	105,039	109,660
July	77,592	118,656	57,577	85,936	103,978
Aug.	58,586	111,274	60,875	87,241	103,241
Sept.	67,791	104,184	68,442	90,873	104,543
Oct.	85,092	101,586	79,907	97,528	107,553
Nov.	94,990	96,476	83,656	100,767	107,890
Dec.	99,577	94,235	95,539	104,853	99,712
Year	73,645	109,713	85,075	99,735	107,043

Coke Furnaces in Blast

Furnaces	Total Stacks	Jan. 1 In Blast	Jan. 1 Capacity per Day	Dec. 1 In Blast	Dec. 1 Capacity per day
New York:					
Buffalo	21	12	5,220	13	5,930
Other N. Y. and Mass.	6	5	1,685	4	1,410
New Jersey	3	0	....	0	....
Pennsylvania:					
Lehigh Valley	12	7	2,935	7	3,025
Spiegeleisen	2	2	230	2	250
Schuylkill Valley	12	6	2,425	5	2,125
Susquehanna Valley	6	3	1,265	3	1,295
Ferromanganese	1	1	75	1	65
Lebanon Valley	4	1	225	1	220
Ferromanganese	2	0	....	0	....
Pittsburgh District	52	35	20,165	37	22,800
Ferro. and Spiegel	4	3	450	3	455
Shenango Valley	13	7	3,370	6	3,050
Western Pennsylvania	18	5	2,570	7	3,415
Ferromanganese	2	2	380	2	390
Maryland	5	5	2,125	5	2,560
Ferromanganese	1	0	....	1	85
Wheeling District	13	9	4,600	8	4,050
Ohio:					
Mahoning Valley	26	16	9,000	17	9,645
Central and Northern	23	17	9,970	18	10,590
Southern	13	5	1,385	6	1,660
Illinois and Indiana	44	29	17,500	30	18,310
Mich., Wis. and Minn.	12	7	3,065	7	3,025
Colo., Mo. and Utah	7	4	1,820	4	1,840
The South:					
Virginia	16	1	240	1	240
Ferromanganese	1	1	85	1	85
Kentucky	5	1	375	1	390
Alabama	34	19	7,490	22	8,645
Ferromanganese	1	0	....	0	....
Tennessee	12	1	210	1	295
Total	371	204	98,860	213	105,850

Production of Steel Companies for Own Use—Gross Tons

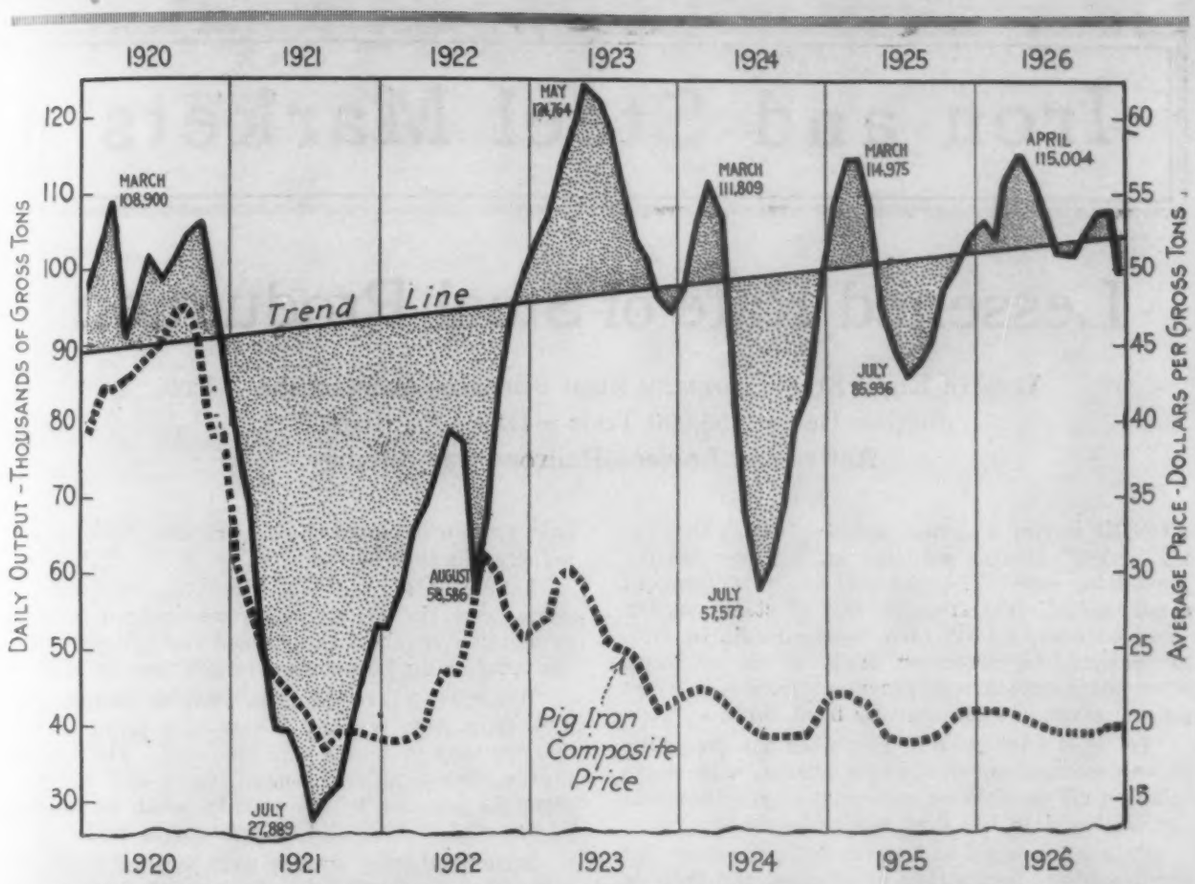
	Total Iron, Spiegel and Ferro 1925	Total Iron, Spiegel and Ferro 1926	Spiegeleisen and Ferromanganese* 1925 Fe-Mn	1925 Spiegel	1926 Fe-Mn	1926 Spiegel
Jan.	2,692,537	2,599,876	23,578	5,418	29,129	7,746
Feb.	2,539,785	2,272,150	18,184	4,910	22,309	7,084
Mar.	2,812,995	2,661,092	20,062	5,449	24,064	7,339
Apr.	2,514,828	2,677,094	21,448	5,341	24,134	7,051
May	2,306,887	2,687,138	22,679	5,294	23,159	6,999
June	2,113,566	2,465,583	19,836	4,972	25,378	5,864
½ year	14,980,598	15,362,933	125,787	31,384	148,173	42,083
July	2,037,160	2,461,161	16,614	5,074	26,877	3,699
Aug.	2,124,439	2,424,687	18,867	4,939	23,557	4,372
Sept.	2,109,205	2,436,733	18,381	5,162	25,218	2,925
Oct.	2,370,382	2,578,830	21,421	5,071	28,473	6,295
Nov.	2,317,888	2,484,620	25,490	6,375	31,903	7,565
Dec.	2,528,120	2,322,180	26,072	7,756	31,627	7,157
Year	28,467,792	30,071,144	252,632	65,761	315,828	74,096

*Includes output of merchant furnaces.

Production of Coke and Anthracite Pig Iron in United States By Months, Beginning Jan. 1, 1924—Gross Tons

	1924	1925	1926
Jan.	3,018,890	3,370,336	3,316,201
Feb.	3,074,757	3,214,143	2,923,415
Mar.	3,466,086	3,564,247	3,441,986
Apr.	3,233,428	3,258,958	3,450,122
May	2,615,110	2,930,807	3,481,428
June	2,026,221	2,673,457	3,235,309
½ year	17,434,492	19,011,948	19,848,461
July	1,784,899	2,664,024	3,223,338
Aug.	1,887,145	2,704,476	3,200,479
Sept.	2,053,264	2,726,198	3,136,293
Oct.	2,477,127	3,023,370	3,334,132
Nov.	2,509,673	3,023,006	3,236,707
Dec.	2,961,702	3,250,448	3,091,060
Year*	31,108,302	36,403,470	39,070,470

*These totals do not include charcoal pig iron. The 1925 production of this iron was 196,164 tons.



Daily Pig Iron Output in December Considerably Less Than in November; Composite Price Unchanged

Inclined line represents the gradually increasing theoretical needs of the country, and shows that production is slightly below the so-called normal. Dotted line represents THE IRON AGE *composite price*

the 4 furnaces blown in last month, 3 were merchant and 1 was an independent steel company stack. The 13 furnaces blown out or banked are credited as follows: 7 to independent steel companies, 2 to the Steel Corporation and 4 to merchant iron producers.

Manganese Alloy Production

The ferromanganese output in December at 31,627 tons was the second largest for the year. The 1926 production at 315,828 tons was the largest since the war and compares with the peak war output of 333,000 tons in 1918.

Total Furnaces Smaller

Serviceable blast furnaces now total 371. The Rebecca furnace of the Kittanning Iron & Steel Mfg. Co. at Kittanning, Pa., and the Alice furnace of the Valley Mold & Iron Corporation, Sharpsville, Pa., have been dismantled.

Furnaces Blown In and Out

Among the furnaces blown in during December was one Northern furnace of Witherbee, Sherman & Co. in New York; the Keystone furnace of the Reading Iron Co. in the Schuylkill Valley; the Claire furnace in the Shenango Valley and No. 2 Steubenville furnace of the Wheeling Steel Corporation in the Wheeling district.

Among the furnaces blown out or banked during December was B furnace at the Lackawanna plant of the Bethlehem Steel Corporation in the Buffalo district; No. 2 Donora furnace of the American Steel & Wire Co. and No. 2 Monessen furnace of the Pittsburgh Steel Co. in the Pittsburgh district; F furnace at the Cambria plant of the Bethlehem Steel Corporation and the Colonial furnace in western Pennsylvania; E furnace at the Maryland plant of the Bethlehem Steel Corporation in Maryland; No. 3 Haselton furnace of the Republic Iron & Steel Co. in the Mahoning Valley; one furnace of the National Tube Co. in northern Ohio; the Sarah furnace in southern Ohio; one Federal furnace in the Chicago district; No. 2 City furnace of the Sloss-Sheffield Steel & Iron Co., one furnace of the Woodward Iron Co. and one Pioneer furnace of the Republic Iron & Steel Co. in Alabama.

High Output of Blast Furnace

A new high record tonnage for a 24-hr. period was made recently in No. 6 furnace, Duquesne works, Carnegie Steel Co., with five casts aggregating 1035 tons. The last previous record was 1013 tons made in one of the wide-hearth furnaces at Edgar Thomson works of the same company. No. 6 Duquesne furnace has a hearth diameter of 19 ft. 6 in., while the furnaces which hitherto have produced 1000 tons or more in a 24-hr. period have hearths of 20 ft. or more diameter.

The directors of the Concrete Reinforcing Steel Institute voted at a meeting held in Chicago, Dec. 15, to hold the third annual meeting of the institute at the Greenbrier Hotel, White Sulphur Springs, W. Va., from March 21 to 23 inclusive.

Reviewing "weekly business conditions," the Department of Commerce places the third week of December ahead of the preceding week in volume of trade. Building construction rose and petroleum production made a new high mark. Coal and coke output dropped and wholesale prices continued to decline.

A steamer, now being built at Lorain, Ohio, for the Inland Steel Co. will be named for L. E. Block, chairman of the board of the Inland Steel Co., Chicago.

Iron and Steel Markets

Lessened Rate of Steel Production

Loss of Eight Steel Company Blast Furnaces in December—Production Below 100,000 Tons a Day—Pig Iron More Active and Lower—Railroad Car Buying

STEEL buying and steel works operation thus far in 1927 give no signs of an upturn from the pre-holiday rate. The fact that December brought a net loss of eight from the list of steel company blast furnaces points to a lessened rate of steel production. In December, 1925, on the contrary, when steel output was growing, there was a net gain of eight in steel company blast furnaces.

Yet steel production in December has been fully up to expectations. Not a few buyers, with stocks running off at the year end, sent in specifications for shipment in the first week of January.

Railroad demand still gives better promise for the immediate future than other lines, and there is the expectation that January will bring some part of the 20,000 cars regarded as hanging over the market to the order books of the car works.

Railroad car orders in December were the largest in months, totaling about 8000, including 2000 just placed by the Missouri Pacific. This compares with 13,000 bought in December, 1925, but was the best month for car builders since the first quarter, when February had 11,000 and March 8000. The Missouri Pacific is in the market for 36 locomotives and may buy more cars. The Southern Pacific will build 1200 cars and 8 locomotives in its own shops in California.

Pig iron production in December was 3,091,060 tons, or 99,712 tons a day, against a November total of 3,236,707 tons, or 107,890 tons a day. The loss of 8178 tons a day was practically all in steel-making iron.

With 13 furnaces blown out and 4 blown in last month, the net loss was 9, including 2 Steel Corporations, 6 independent and 1 merchant.

The capacity of the 204 furnaces in blast on Jan. 1 was 98,860 tons a day, as against 105,850 tons a day for 213 furnaces on Dec. 1.

In the finished steel market the different situation in regard to plates and shapes on the one hand and steel bars on the other hand is attracting attention. Most large buyers of plates and shapes have covered for the first quarter, whereas few buyers of bars have done so. The latter have been using 1.90c bars up to this time and have not been willing to contract at 2c.

More active inquiry for pig iron has come out, particularly in northern and southern Ohio. At Cleveland one consumer is in the market for 25,000 to 30,000 tons and another for 9000 tons. Northern Ohio furnaces are again rather aggressively active in southern Ohio and Indiana, and sales have been made at least 50c. below the recent market. Pig iron has declined 50c. also in eastern Pennsylvania, New York iron being again a factor in that market.

Last year for the first time since the war exports from the six countries which lead in steel production reached and passed the pre-war rate, the total being 7.5 per cent larger than in 1913.

World steel production in 1926, as compiled by THE IRON AGE, reached a new high point at 89,500,000 tons of ingots and castings. The United States, with 48,250,000 tons of ingots and castings, made 54 per cent of the world's total, as against 52 per cent in 1925 and 42 per cent in 1913.

Structural steel awards were swelled to 50,000 tons in the week by two large contracts, 23,000 tons for New Year subways and 12,000 tons for a Chicago bank building. Inquiries were less than 18,000 tons. In Eastern cities, notably New York and Philadelphia, structural steel fabricators are quoting very low prices on building work. The landing of 1245 tons of Belgian shapes at Philadelphia last week was a reminder of the steady filtering in of foreign structural steel.

At Chicago the demand for alloy steel bars for automobile plants has increased and producers there are operating at 75 per cent of capacity, as against 65 per cent at the low point in late November.

Sales of heavy melting steel totaling 20,000 or 25,000 tons have been made at $16, delivered, to eastern Pennsylvania mills, yet the Eastern scrap market remains generally weak.

A leading producer of ferromanganese, having made large sales for first half, has withdrawn from the market.

Maintenance of high wages by the larger Connellsville coke producers will mean the shutting down of some of the smaller operations. Meanwhile coke prices continue higher than had been expected; yet in the face of a stiff fuel cost pig iron producers are competing more sharply.

Increased steel buying in Germany, particularly in semi-finished steel, has resulted in somewhat less export pressure there at a time when our Treasury Department is actively searching for evidence that German steel is being dumped at Atlantic ports.

By another week it is expected that the Treasury Department will give its decision regarding alleged dumping of German pig iron in the United States.

Lower prices for foundry iron at Philadelphia and for basic iron have reduced THE IRON AGE pig iron composite price to $19.71, from the $19.88 of two preceding weeks.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

For Early Delivery

Pig Iron, Per Gross Ton:	Jan.4, 1927	Dec.27, 1926	Dec.7, 1926	Jan.5, 1926
No. 2, fdy., Philadelphia	**$22.26**	**$22.76**	**$23.26**	$23.76
No. 2, Valley Furnace	18.50	18.50	19.00	20.50
No. 2, Southern, Cin'ti	23.69	23.69	23.69	25.69
No. 2, Birmingham	20.00	20.00	20.00	22.00
No. 2 foundry, Chicago*	21.00	21.00	21.00	23.00
Basic, del'd eastern Pa	*21.50*	22.00	22.00	23.00
Basic, Valley furnace	*18.00*	18.50	18.50	20.00
Valley Bessemer, del'd P'gh	21.26	21.26	21.76	22.76
Malleable, Chicago*	21.00	21.00	21.00	23.00
Malleable, Valley	18.50	18.50	19.00	20.50
Gray forge, Pittsburgh	19.76	19.76	20.26	21.76
L. S. charcoal, Chicago	27.04	27.04	27.04	29.04
Ferromanganese, furnace	100.00	100.00	100.00	115.00

Rails, Billets, Etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	36.96
Bess. billets, Pittsburgh	35.00	35.00	35.00	35.00
O.-h. billets, Pittsburgh	35.00	35.00	35.00	35.00
O.-h. sheet bars, P'gh	36.00	36.00	36.00	36.00
Forging billets, P'gh	40.00	40.00	40.00	40.00
O.-h. billets, Phila	40.30	40.30	40.30	41.30
Wire rods, Pittsburgh	45.00	45.00	45.00	45.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.90	1.90	1.90	1.90

Finished Iron and Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.22	2.22	2.22	2.22
Iron bars, Chicago	2.00	2.00	2.00	2.00
Steel bars, Pittsburgh	2.00	2.00	2.00	2.00
Steel bars, Chicago	2.10	2.10	2.10	2.10
Steel bars, New York	2.34	2.34	2.34	2.34
Tank plates, Pittsburgh	1.90	1.90	1.90	1.90
Tank plates, Chicago	2.10	2.10	2.10	2.10
Tank plates, New York	2.24	2.24	2.24	2.09
Beams, Pittsburgh	2.00	2.00	2.00	1.90
Beams, Chicago	2.10	2.10	2.10	2.10
Beams, New York	2.34	2.34	2.34	2.24
Steel hoops, Pittsburgh	2.50	2.50	2.50	2.50

Sheets, Nails and Wire, *Per Lb. to Large Buyers:*	Jan.4, 1927 Cents	Dec.27, 1926 Cents	Dec.7, 1926 Cents	Jan.5, 1926 Cents
Sheets, black, No. 24, P'gh	3.00	3.00	3.00	3.20
Sheets, black, No. 24, Chicago dist. mill	3.20	3.20	3.20	3.30
Sheets, galv., No. 24, P'gh	3.85	3.85	3.85	4.15
Sheets, galv. No. 24, Chicago dist. mill	4.05	4.05	4.05	4.25
Sheets, blue, 9 & 10, P'gh	2.30	2.30	2.30	2.50
Sheets, blue, 9 & 10, Chicago dist. mill	2.50	2.50	2.50	2.60
Wire nails, Pittsburgh	2.65	2.65	2.65	2.65
Wire nails, Chicago dist. mill	2.70	2.70	2.70	2.70
Plain wire, Pittsburgh	2.50	2.50	2.50	2.50
Plain wire, Chicago dist. mill	2.55	2.55	2.55	2.55
Barbed wire, galv., P'gh	3.35	3.35	3.35	3.35
Barbed wire, galv., Chicago dist. mill	3.40	3.40	3.40	3.40
Tin plate, 100 lb. box, P'gh	$5.50	$5.50	$5.50	$5.50

Old Material, Per Gross Ton:				
Carwheels, Chicago	**$15.00**	$14.50	$14.50	$18.00
Carwheels, Philadelphia	16.50	16.50	16.50	18.50
Heavy melting steel, P'gh	**17.00**	16.50	17.00	19.00
Heavy melting steel, Phila	15.50	15.50	15.50	17.50
Heavy melting steel, Ch'go	13.00	13.00	13.00	15.25
No. 1 cast, Pittsburgh	16.00	16.00	16.00	17.50
No. 1 cast, Philadelphia	17.00	17.00	17.00	18.50
No. 1 cast, Ch'go (net ton)	16.50	16.50	16.00	17.00
No. 1 RR. wrot., Phila	17.00	17.00	17.00	18.50
No. 1 RR. wrot. Ch'go (net)	12.00	12.00	12.00	13.50

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	**$3.75**	$3.50	$3.50	$4.75
Foundry coke, prompt	4.50	4.50	4.50	5.50

Metals, *Per Lb. to Large Buyers:*	Jan. 3, 1927 Cents	Dec. 27, 1926 Cents	Dec. 7, 1926 Cents	Jan. 5, 1926 Cents
Lake copper, New York	*13.50*	13.62½	13.75	14.25
Electrolytic copper, refinery	*13.00*	13.25	13.37½	13.87½
Zinc, St. Louis	6.97½	7.02½	7.00	8.67½
Zinc, New York	7.32½	7.37½	7.35	9.02½
Lead, St. Louis	7.62½	7.65	7.65	9.00
Lead, New York	7.80	7.80	7.90	9.25
Tin (Straits), New York	**67.50**	67.00	69.50	63.25
Antimony (Asiatic), N. Y.	*13.00*	13.25	13.75	25.00

* The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Steel Demand Improves—Wages at Coal Mines and Coke Plants to Remain Unchanged

PITTSBURGH, Jan. 4.—The steel industry starts the new year with a lighter order book in all finished products, except rails, than it had at the beginning of 1926, but large first quarter obligations a year ago were in no small measure the result of advancing prices during the closing months of 1925, a tendency entirely lacking in the past 60 days. Present obligations, it is believed, are sufficient to engage Pittsburgh district capacity at approximately 70 per cent through this month.

December appears to have been the lightest month of 1926 in point of shipments, and as output was gaited rather closely to the outward movement, there undoubtedly has been some accumulation of orders. Business of the past week has been better than that of the two preceding weeks, but in almost all products it represents the actual or known requirements of buyers, this being evident from the fact that orders are individually small and many of them carry rush shipment tags. Consumers have been living off their stocks in the past 60 days and now see fresh needs; it is doubtful if many of them yet have very definite ideas of what 1927 will produce.

Prices are starting the new year at substantially the same level as a year ago and where they were so far as actual invoices were concerned throughout the entire year. Sheets are off $2 a ton from where they were a year ago on black and $5 a ton on galvanized—in a comparison of the prices of No. 28 gage—while blue annealed sheets a year ago stood at 2.50c., base (No. 9 and 10 gage), Pittsburgh, against 2.30c., base, today's ruling price. Cold-finished steel bars show a decline of $2 a ton, and cold-rolled strips are down $10 a ton from the prices of a year ago, using the ordinary tonnage prices as the basis of comparison. Semi-finished steel, plates, bars, tin plate, wire products and pipe are all priced at the same figures as a year ago, with shapes $2 a ton higher. Large-lot buyers of bars and shapes have not had to pay more than 1.90c., base Pittsburgh, and 2c. has been the ruling ordinary tonnage price, despite efforts to make that quotation the minimum. As there are no signs that prices will be higher in the near future, it is not surprising that buyers are taking plenty of time about entering their orders and that the new year is getting off to a slower start than did last year.

The pig iron market has lapsed into dullness following the recent big sales of foundry iron, but it is probable that larger demands soon will develop, since it is now established that there is to be no general reduction in wages at the coal mines and coke plants and those who have held off for lower prices for iron based on lower coke costs are likely to see the advantage of purchases.

Pig Iron.—The market has been very quiet since the recent purchase by the Standard Sanitary Mfg. Co. Other consumers of foundry iron seem to have been waiting to see whether wages would be reduced in the Connellsville district and thus bring about lower-priced

coke. Moreover, it seems that some of the large users of that grade did not use up all the iron bought for delivery over the last half of 1926 and can afford to stay out of the market for a while longer. The American Steel Foundries was able to secure 2500 tons of basic iron for its Verona, Pa., works at $18, Valley furnace. The iron did not come from Valley furnaces, but the sale must be considered as establishing the market on Valley iron since the steel companies which sold regularly have some surplus iron and have a distinct advantage in freight over Valley furnaces to Pittsburgh district destinations. The quotable market in this grade is now $18 to $18.50. There is still a quotation of $20, Valley furnace, on Bessemer iron, but lots of any considerable size can be placed at $19.50. For foundry and malleable iron, the large-lot price is $18.50, while for single carloads $19 is asked. The furnace of the Reliance Coke & Furnace Co., Sharpsville, Pa., resumed production Dec. 28, but this gain to the active list is offset by the fact that the Sharpsville Furnace Co. stack will be blown out late this week for relining.

We quote Valley furnace, the freight for delivery to the Cleveland or Pittsburgh district being $1.76 per gross ton:

Basic	$18.00 to $18.50
Bessemer	19.50 to 20.00
Gray forge	18.00 to 18.50
No. 2 foundry	18.50 to 19.00
No. 3 foundry	18.00 to 18.50
Malleable	18.50 to 19.00
Low phosphorus, copper free	28.00

Ferroalloys.—Consumers of ferromanganese have been signing contracts for first half requirements, and it is said that only two steel companies of size remain uncovered. No estimate of the tonnage under contract is possible, for the reason that the contracts are on a requirement basis. The Bethlehem Steel Co. is reported to have withdrawn from the market, and other domestic producers have become well obligated against probable production for the first six months of the year. Little British material has been sold. Much of the production of spiegeleisen over the first half of the year has been spoken for, and there are few important consumers of 50 per cent ferrosilicon who have not signed up for their 1927 requirements. Prices are given on page 103.

Semi-Finished Steel.—As is true in almost all finished steel products, the new year finds producers of billets, slabs and sheet bars with a fair volume of orders, but very few contracts. Buyers are continuing last year's policy of buying for short periods instead of on quarterly basis and holding to the sources of supply from which they drew last year. Public quotations still are $35, Pittsburgh, for large billets and slabs and $36 for sheet bars and small billets and slabs, but it is believed that these prices prevail only in cases where the buyer does not depend upon regular supply sources.

Steel and Iron Bars.—Small orders for steel bars have been accumulating over the past few weeks, and with a good many of them calling for prompt shipment there is a better operation than recently of rolling mills. There is no evidence of a higher price than 2c., base Pittsburgh, on small lots.

Structural Steel.—Ordinary tonnages are still priced at 2c., base Pittsburgh, with large lots, as usual, subject to special consideration. Mills and shops are starting the new year with much smaller backlogs than they had a year ago, as might be expected from the fact that new structural steel awards over the past three months have been on a tapering scale and not in keeping with completed orders.

Plates.—Mills in this district still have fairly good schedules on barge, tank and large outside diameter pipe specifications, and there is the prospect of good-sized railroad car orders. River barges have taken a good deal of steel in the past year, the tonnage in the launchings being estimated at above 60,000 tons, as compared with 55,000 tons in 1925. Mills still are holding firmly to 1.90c., base Pittsburgh, for tank plates.

Wire Products.—The turn of the year has brought about some loosening in specifications, and the market has taken on an aspect of activity that was lacking last month when there was a general tendency to limit shipments. Prices are steady.

Rails and Track Supplies.—Standard-section rails are beginning to move against 1927 contracts, but specifications against accessories are waiting on the approach of the track-laying season.

Tubular Goods.—Business still reflects the off season for consumption, but there is fairly high engagement of capacity, as manufacturers are expecting the spring demand to be good in standard-weight pipe and that there will be a revival in the demand from the oil and gas industry when weather conditions are more favorable for drilling.

Sheets.—Business is better in sheets, but the gain is in the number rather than in the size of the orders, which still run to small lots and in many cases call for very prompt shipment. Prices show no betterment from the manufacturers' viewpoint, and while the first quarter prices announced two months ago are still named by some of the larger producers, most of the business is at a concession of at least $2 a ton. Automobile companies seem to have provided for most of their requirements for this month in December releases against suspended shipments and in supplementary purchases. Not much new business from that source has developed, and the low prices at which wide strips are offered is held partly to blame.

Tin Plate.—A continued high rate of operation is noted at tin plate mills. Container manufacturers are being won over to the idea of taking shipments in advance of their requirements, and the movement from the mills is increasing.

Cold-Finished Steel Bars and Shafting.—There has not been nearly so much first quarter contracting this year as there was a year ago, but the explanation is that in the closing months of 1925, prices were rising as a result of the imposition of a new card of extras. Current demands are fairly large in number, but individually small. The ordinary tonnage price remains at 2.40c., base Pittsburgh.

Hot-Rolled Flats.—Demand still reflects the curtailed rate of automobile production, although that and some of the other consuming industries in the past

THE IRON AGE Composite Prices

Finished Steel

Jan. 4, 1927, 2.453c Per Lb.

One week ago	2.453c.
One month ago	2.453c.
One year ago	2.453c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets. These products constitute 87 per cent of the United States output of finished steel.

	High		Low	
1926	2.453c.,	Jan. 5;	2.403c.,	May 18
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18
1924	2.789c.,	Jan. 15;	2.460c.,	Oct. 14
1923	2.824c.,	April 24;	2.446c.,	Jan. 2

Pig Iron

Jan. 4, 1927, $19.71 Per Gross Ton

One week ago	$19.88
One month ago	20.04
One year ago	21.79
10 year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1926	$21.54,	Jan. 5;	$19.46,	July 13
1925	22.50,	Jan. 13;	18.96,	July 7
1924	22.88,	Feb. 26;	19.21,	Nov. 3
1923	30.86,	March 20;	20.77,	Nov. 20

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base Per Lb.
F.o.b. Pittsburgh mills	2.00c.
F.o.b. Chicago	2.10c.
Del'd Philadelphia	2.32c.
Del'd New York	2.34c.
Del'd Cleveland	2.19c.
F.o.b. Cleveland, sizes up to 1-in. rounds	2.00c.
F.o.b. Birmingham	2.15c. to 2.25c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills	2.00c.

Rail Steel

F.o.b. mill	1.80c. to 1.90c.
F.o.b. Chicago	1.90c. to 2.00c.

Iron

Common iron, f.o.b. Chicago	2.00c.
Refined iron, f.o.b. P'gh mills	2.90c. to 3.00c.
Common iron, del'd Philadelphia	2.22c.
Common iron, del'd New York	2.24c.

Tank Plates

	Base Per Lb.
F.o.b. Pittsburgh mill	1.90c.
F.o.b. Chicago	2.10c.
F.o.b. Birmingham	2.05c. to 2.15c.
Del'd Cleveland	2.09c.
Del'd Philadelphia	2.22c.
Del'd New York	2.24c.
C.i.f. Pacific ports	2.30c.

Structural Shapes

	Base Per Lb.
F.o.b. Pittsburgh mills	2.00c.
F.o.b. Chicago	2.10c.
F.o.b. Birmingham	2.15c. to 2.25c.
Del'd Cleveland	2.19c.
Del'd Philadelphia	2.22c. to 2.32c.
Del'd New York	2.34c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Flats (Hoops, Bands and Strips)

	Base Per Lb.
All gages, narrower than 6 in., P'gh	2.50c.
All gages, 6 in. and wider, P'gh	2.30c.
All gages, narrower than 6 in., Chicago,	2.50c. to 2.60c.
All gages, 6 in. and wider, Chicago	2.50c.

Cold-Finished Steel

	Base Per Lb.
Bars, f.o.b. Pittsburgh mills	2.30c. to 2.40c.
Bars, f.o.b. Chicago	2.40c.
Bars, Cleveland	2.45c.
Shafting, ground, f.o.b. mill	*2.55c. to 3.00c.
Strips, f.o.b. Pittsburgh mills	3.00c. to 3.40c.
Strips, f.o.b. Cleveland mills	3.00c. to 3.40c.
Strips, delivered Chicago	3.30c. to 3.70c.
Strips, f.o.b. Worcester mills	3.75c.

*According to size.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

	Base Per Keg
Wire nails	$2.65
Galv'd nails, 1-in. and longer	4.65
Galv'd nails, shorter than 1-in.	4.90
Galvanized staples	3.35
Polished staples	3.10
Cement coated nails	2.65

	Base Per 100 Lb.
Bright plain wire, No. 9 gage	$2.50
Annealed fence wire	2.65
Spring wire	3.50
Galv'd wire, No. 9	3.10
Barbed wire, galv'd	3.35
Barbed wire, painted	3.10

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester, Mass., mill $3 a ton higher on production of that plant; Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

Woven Wire Fence

Base to Retailers Per Net Ton

F.o.b. Pittsburgh	$65.00
F.o.b. Cleveland	65.00
F.o.b. Anderson, Ind.	66.00
F.o.b. Chicago district mills	67.00
F.o.b. Duluth	68.00
F.o.b. Birmingham	68.00

Sheets

Blue Annealed

	Base Per Lb.
Nos. 9 and 10, f.o.b. Pittsburgh	2.25c. to 2.40c.
Nos. 9 and 10, f.o.b. Ch'go dist. mill	2.50c.
Nos. 9 and 10, del'd Philadelphia	2.57c. to 2.72c.
Nos. 9 and 10, f.o.b. Birmingham	2.60c. to 2.70c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.90c. to 3.10c.
No. 24, f.o.b. Ch'go dist. mill	3.20c.
No. 24, del'd Philadelphia	3.22c. to 3.32c.
No. 24, f.o.b. Birmingham	3.30c. to 3.40c.

Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade	4.10c. to 4.25c.
No. 24, f.o.b. Pittsburgh, B grade	3.95c. to 4.10c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.85c. to 3.95c.
No. 24, f.o.b. Chicago dist. mill	4.05c.
No. 24, del'd Philadelphia	4.17c. to 4.32c.
No. 24, f.o.b. Birmingham	4.20c. to 4.30c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	3.10c. to 3.25c.
No. 28, f.o.b. Chicago dist. mill	3.25c. to 3.35c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	4.25c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill	4.30c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.50
Standard cokes, f.o.b. Gary and Elwood, Ind.	5.60

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)

(Per package, 20 x 28 in.)

8-lb. coating, 100 lb. base	$11.40
8-lb. coating I.C.	11.70
15-lb. coating I.C.	14.85
20-lb. coating I.C.	$16.20
25-lb. coating I.C.	17.90
30-lb. coating I.C.	19.45
40-lb. coating I.C.	21.65

Alloy Steel Bars

(F.o.b. Pittsburgh or Chicago)

S. A. E. Series Numbers		Base Per 100 Lb.
2100*	(1½% Nickel, 0.10% to 0.20% Carbon)	$3.20 to $3.25
2300	(3½% Nickel)	4.35 to 4.50
2500	(5% Nickel)	5.50 to 5.65
3100	(Nickel Chromium)	3.40 to 3.50
3200	(Nickel Chromium)	5.00 to 5.25
3300	(Nickel Chromium)	7.00 to 7.25
3400	(Nickel Chromium)	6.25 to 6.50
5100	(Chromium Steel)	3.40 to 3.50
5200*	(Chromium Steel)	7.00 to 7.50
6100	(Chrom. Vanadium bars)	4.30
6100	(Chrom. Vanad. spring steel)	3.80
9250	(Silicon Manganese spring steel)	3.20 to 3.25
	Carbon Vanadium (0.45% to 0.55% Carbon, 0.15% Vanad.)	4.10 to 4.20
	Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chrom., 0.15 Vanad.)	4.30
	Chromium Molybdenum bars (0.80—1.10 Chrom., 0.25—0.40 Molyb.)	4.25 to 4.35
	Chromium Molybdenum bars (0.50—0.70 Chrom., 0.15—0.25 Molyb.)	3.40 to 3.50
	Chromium Molybdenum spring steel (1 — 1.25 Chrom., 0.30 — 0.50 Molybdenum)	4.50 to 4.75

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in. the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 in. down to and including 2½-in. squares, the price is $5 a gross ton above the 4 x 4 billet price.

*Not S. A. E. specifications, but numbered by manufacturers to conform to S. A. E. system.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	$36.00 to $38.00

Track Equipment

(F.o.b. Mill)

	Base Per 100 Lb.
Spikes, ⅝ in. and larger	$2.80 to $3.00
Spikes, ½ in. and smaller	2.90 to 3.25
Spikes, boat and barge	3.25
Track bolts, all sizes	3.90 to 4.50
Tie plates, steel	2.35
Angle bars	2.75

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	45	19½	⅛ to ⅜	+11	+39
¼ to ⅜	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	12
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ to ⅜	+10	+54
¼ to ⅜	47	30½	½	21	7
½	55	42½	¾	28	13
¾	58	47½	1 to 1½	30	14
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	7
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

To the large jobbing trade the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to large jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel		Charcoal Iron	
2 to 2¼ in.	27	1½ in.	+18
2½ to 2¾ in.	37	1⅝ to 1⅞ in.	+ 8
3 in.	40	2 to 2¼ in.	— 2
3¼ to 3¾ in.	42½	2½ to 3 in.	— 7
4 to 13 in.	46	3¼ to 4¼ in.	— 9

Beyond the above discounts, 5 to 7 fives extra are given on lap welded steel tubes and 2 tens to 2 tens and 1 five on charcoal iron tubes.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	60	3 in.	45
1¼ to 1½ in.	52	3¼ to 3½ in.	47
1⅝ in.	36	4 in.	50
2 to 2¼ in.	31	4½, 5 and 6 in.	45
2½ to 2¾ in.	39		

Hot Rolled

2 and 2¼ in.	34	3¼ and 3½ in.	50
2½ and 2¾ in.	42	4 in.	53
3 in.	48	4½, 5 and 6 in.	48

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base	55
Carbon, 0.30% to 0.40%, base	50

Plus differentials for lengths over 18 ft. and for commercially exact lengths. Warehouse discounts on small lots are less than the above.

fortnight have furnished a larger number of orders than in November or early December. Prices are steady.

Cold-Rolled Strips.—There has been a gain in business, and makers have fairly good schedules to start the year, but cannot look very far ahead, as the buying generally is for early shipment. Prices still are unsettled.

Coke and Coal.—Spot furnace coke is scarce this week on account of the loss of production incident to the observance of the holiday. The fact that there will be no reduction in wages by the larger Connellsville district operators for the present has left the smaller producers little choice except to suspend. Steady work is offered the men at the steel company coal and coke plants at the full union scale of wages and at the larger commercial plants this situation is being met by keeping up wages to avoid the loss of men that a cut at this time would entail. It is now commonly expected that the Nov. 1 wage advance will be continued indefinitely in the Connellsville district. Most producers are holding to $4 per net ton at ovens for spot furnace coke and $3.75 is the lowest price now available. Spot foundry coke is holding at recent prices. Coal still is dull and easy.

Old Material.—The market is showing a firmer tendency. Not much consumer interest is noted, but mills that recently were holding up shipments are beginning to let them come in and dealers with short orders to cover have become a little nervous over the fact that offerings of scrap have been rather light. Bids of $16.50 for heavy melting steel by dealers have not availed much in view of bids of $16.75 and even $17 by other dealers. Small sales of new industrial scrap at $17.25 are noted. This grade is quotable from $16.75 to $17.25, but the ruling price to consumers is $17. Blast furnace grades have stiffened. The Pennsylvania Railroad January scrap list, closing Jan. 5, contains 29,619 net tons, the smallest in several months.

We quote for delivery to consumers' yards in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

Per Gross Ton	
Heavy melting steel	$16.75 to $17.25
Scrap rails	16.00 to 16.50
No. 1 cast, cupola size	16.00 to 16.50
Compressed sheet steel	15.50 to 16.00
Bundled sheets, sides and ends	14.50 to 15.00
Railroad knuckles and couplers	18.50 to 19.00
Railroad coil and leaf springs	18.50 to 19.00
Low phosphorus blooms and billet ends	21.00 to 21.50
Low phosphorus mill plates	20.50 to 21.00
Low phosphorus, light grade	17.50 to 18.00
Low phosphorus punchings	18.50 to 19.00
Steel car axles	21.50 to 22.00
Cast iron wheels	16.00 to 16.50
Rolled steel wheels	18.50 to 19.00
Machine shop turnings	12.00 to 12.50
Short shoveling steel turnings	13.00 to 13.50
Sheet bar crops	17.00 to 17.50
Heavy steel axle turnings	15.00 to 15.50
Short mixed borings and turnings	12.50 to 13.00
Heavy breakable cast	15.00 to 15.50
Cast iron borings	12.50 to 13.00
No. 1 railroad wrought	13.00 to 13.50
No. 2 railroad wrought	16.75 to 17.25
Railroad or automobile malleable scrap	16.50 to 17.00

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Tank plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.90c.
Black sheets (No. 24 gage), 25 or more bundles	3.95c.
Galvanized sheets (No. 24 gage), 25 or more bundles	4.70c.
Blue annealed sheets (No. 10 gage), 25 or more sheets	3.40c.
Cold-finished shafting and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.60c.
Spikes, large	3.30c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Bolts, track	4.90c.
Wire, black soft annealed, base per 100 lb.	$3.00
Wire, galvanized soft, base per 100 lb.	3.00
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

Chicago

Bar Demand Heavier and Sheet Specifications Gain—Blast Furnace Goes Out

CHICAGO, Jan. 4.—The new year opens with little or no change in the iron and steel market. In plates and shapes, specifications are holding steady at the December rate. Demand for soft steel bars is gradually expanding, this being due in large measure to improvement in the automobile trade. New buying is gaining headway, and for the week it is slightly in excess of shipments. Outstanding structural and railroad car inquiry is large and active. Orders to mills are now going forward from car builders who recently have taken contracts. This business is timely, since structural specifications have been slow during the past few weeks, with the result that deliveries have been in close accord with rolling schedules, which in many cases have not conformed to economical mill operation. The demand for sheets has broadened, and users now find that specifications issued late in the old year for delivery early in January are not receiving as prompt attention as was given those released during the early part of December.

Pig Iron.—A Federal furnace was blown out Dec. 30, leaving five merchant stacks active out of 10 in this district. The lessened rate of production does not indicate that consumption has fallen off in like proportion, inasmuch as dealers are making larger demands on the steel mill blast furnaces at Indiana Harbor. In shipments, the year just closed has been one of the largest in the history of local pig iron production, deliveries having been made at a rate exceeding 100,000 tons a month. Orders are accumulating this week as some users release tonnage for shipment during the current month. Forward contracting continues at a steady gait, although it is more pronounced now in malleable iron than in the other grades. A user in western Michigan is in the market for 2000 tons of malleable, and a melter in Chicago will take 2000 tons of Northern foundry for delivery during the first quarter. January shipment is asked for by a Milwaukee foundry that will take 500 tons.

Quotations on Northern foundry, high phosphorus and malleable iron are f.o.b. local furnace, and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumers' yards:

Northern No. 2 foundry, sil. 1.75 to 2.25	$21.00
Northern No. 1 foundry, sil. 2.25 to 2.75	21.50
Malleable, not over 2.25 sil	21.00
High phosphorus	21.00
Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	27.04
Southern No. 2 (all rail)	26.01
Southern No. 2 (barge and rail)	24.18
Low phos., sil. 1 to 2 per cent, copper free	$31.50 to 32.50
Silvery, sil. 8 per cent	33.29
Bessemer ferrosilicon, 14 to 15 per cent	46.79

Plates.—Several small orders have been placed for oil tankage material, totaling 1000 tons, and fresh inquiry stands at 5000 to 6000 tons. Specifications for plates are at the late December rate, and mills are making prompt deliveries. In this immediate territory mill prices are steady at 2.10c., Chicago, but competition is unusually keen to the east, south and southwest.

The mill quotation on plates is 2.10c. per lb., base, Chicago.

Structural Material.—Structural awards for the week total 15,000 tons. The formal contract for 12,000 tons for the State Bank of Chicago building is expected to be placed this week with the American Bridge

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b. Pittsburgh or Youngstown

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and over	$35.00
Rerolling, under 4-in. to and including 1¾-in.	36.00
Forging, ordinary	40.00
Forging, guaranteed	45.00

Sheet Bars

	Per Gross Ton
Open hearth or Bessemer	$36.00

Slabs

	Per Gross Ton
8 in. x 2 in. and larger	$35.00
Smaller than 8 in. x 2 in.	36.00

Skelp

	Per Lb.
Grooved	1.90c.
Sheared	1.90c.
Universal	1.90c.

Wire Rods

	Per Gross Ton
*Common soft, base	$45.00
Screw stock	$5.00 per ton over base
Carbon 0.20% to 0.40%	3.00 per ton over base
Carbon 0.41% to 0.55%	5.00 per ton over base
Carbon 0.56% to 0.75%	7.50 per ton over base
Carbon over 0.75%	10.00 per ton over base
Acid	15.00 per ton over base

*Chicago mill base is $46. Cleveland mill base, $45.

Prices of Raw Materials

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.55
Old range non-Bessemer, 51.50% iron	4.40
Mesabi Bessemer, 51.50% iron	4.40
Mesabi non-Bessemer, 51.50% iron	4.25
High phosphorus, 51.50% iron	4.15

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria	9.50c. to 10c.
Iron ore, Swedish, average 66% iron	9.50c.
Manganese ore, washed, 52% manganese, from the Caucasus	40c.
Manganese ore, high grade, nominal	35c. to 44c.
Tungsten ore, high grade, per unit, in 60% concentrates	$11.75 to $12.50

	Per Ton
Chrome ore, Indian basic, 48% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.50

	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$3.75 to $4.00
Foundry, f.o.b. Connellsville prompt	4.50 to 5.50
Foundry, by-product, Ch'go ovens	9.75
Foundry, by-product, New England, del'd	13.50
Foundry, by-product, Newark or Jersey City, delivered	10.59 to 11.77
Foundry, Birmingham	5.50 to 6.00
Foundry, by-product, St. Louis or Granite City	10.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.75 to $2.00
Mine run coking coal, f.o.b. W. Pa. mines	1.85 to 2.00
Mine run gas coal, f.o.b. Pa. mines	2.10 to 2.25
Steam slack, f.o.b. W. Pa. mines	1.40 to 1.55
Gas slack, f.o.b. W. Pa. mines	1.60 to 1.75

Ferromanganese

	Per Gross Ton
Domestic, 80%, furnace or seab'd	$100.00
Foreign, 80%, Atlantic or Gulf port, duty paid	100.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$37.00
Domestic, 16 to 19%	36.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$85.00
75%	145.00

Per Gross Ton Furnace		*Per Gross Ton Furnace*	
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	$45 to 46.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		*Per Gross Ton*	
10%	$34.00	12%	$38.00
11%	36.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		*Per Gross Ton*	
6%	$26.50	10%	$32.00
7%	27.50	11%	34.00
8%	28.50	12%	36.00
9%	30.00		

Other Ferroalloys

Ferrotungsten, per lb. contained metal, del'd	$1.05 to $1.10
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.50c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.25 to $4.00
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per net ton	$91.00
Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per net ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines	$18.00
No. 2 lump, Illinois and Kentucky mines	$20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid,	$17.00 to $17.50
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	$32.50

Fire Clay

	Per 1000 f.o.b. Works	
	High Duty	Moderate Duty
Pennsylvania	$40.00 to $43.00	$38.00 to $40.00
Maryland	43.00 to 46.00	38.00 to 40.00
New Jersey	55.00 to 75.00	
Ohio	40.00 to 43.00	38.00 to 40.00
Kentucky	40.00 to 43.00	38.00 to 40.00
Illinois	40.00 to 43.00	35.00 to 38.00
Missouri	40.00 to 43.00	35.00 to 38.00
Ground fire clay, per ton	6.50 to 7.50	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$40.00 to $43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.00 to 9.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

(Less-than-Carload Lots)

F.o.b. Pittsburgh, Cleveland, Birmingham and Chicago)

	Per Cent Off List
Machine bolts, small, rolled threads	60 and 10
Machine bolts, all sizes, cut threads	50, 10 and 10
Carriage bolts, smaller and shorter, rolled threads	50, 10 and 10
Carriage bolts, cut threads, all sizes	50 and 10
Eagle carriage bolts	65 and 10
Lag bolts	60, 10 and 10
Plow bolts, Nos. 2 and 7 heads	50 and 10
(Extra of 20% for other style heads)	
Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in.,	45, 10 and 5
Larger and longer sizes	45, 10 and 5
Bolt ends with hot-pressed nuts	50, 10 and 10
Bolt ends with cold-pressed nuts	45, 10 and 5
Hot-pressed nuts, blank and tapped, square,	4.00c. per lb. off list
Hot-pressed nuts, blank or tapped, hexagons,	4.40c. per lb. off list
C.p.c. and t. square or hex. nuts, blank or tapped	4.10c. per lb. off list
Washers*	6.75c. to 6.50c. per lb. off list

*F.o.b. Chicago and Pittsburgh.

The discount on machine, carriage and lag bolts is 5 per cent more than above for car lots. On hot-pressed and cold-punched nuts the discount is 25c. more per 100 lb. than quoted above for car lots.

Bolts and Nuts

(Quoted with actual freight allowed up to but not exceeding 50c. per 100 lb.)

	Per Cent Off List
Semi-finished hexagon nuts:	
⅞ in. and smaller, U. S. S.	80, 10, 10 and 5
1 in. and larger, U. S. S.	75, 10, 10 and 5
Small sizes, S. A. E.	80, 10, 10, 10 and 5
S. A. E., ⅞ in. and larger	75, 10, 10, 10 and 5
Stove bolts in packages	80, 10 and 5
Stove bolts in bulk	80, 10, 5 and 2½
Tire bolts	60 and 5

Semi-Finished Castellated and Slotted Nuts

(Actual freight allowed up to but not exceeding 50c. per 100 lb.)

(To jobbers and consumers in large quantities)

	Per 100 Net S.A.E.	Per 100 Net U.S.S.		Per 100 Net S.A.E.	Per 100 Net U.S.S.
¼-in.	$0.44	$0.44	⅞ in.	$2.35	$2.40
5/16-in.	0.515	0.515	7/8-in.	3.60	3.60
⅜-in.	0.62	0.66	1-in.	5.65	5.80
7/16-in.	0.79	0.90	1⅛-in.	8.90	8.90
½-in.	1.01	1.05	1¼-in.	12.60	13.10
9/16-in.	1.38	1.42	1⅜-in.	18.25	18.35
⅝-in.	1.70	1.73	1½-in.	21.00	21.00

Larger sizes.—Prices on application.

Large Rivets

	Base per 100 Lb.
F.o.b. Pittsburgh	$2.35 to $2.50
F.o.b. Cleveland	2.70
F.o.b. Chicago	2.60 to 2.70

Small Rivets

	Per Cent Off List
F.o.b. Pittsburgh	70, 10 and 5 to 70 and 10
F.o.b. Cleveland	70, 10 and 5 to 70 and 10
F.o.b. Chicago	70, 10 and 5 to 70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb.)

	Per Cent Off List
Milled cap screws	80 and 10
Milled standard set screws, case hardened,	80 and 5
Milled headless set screws, cut thread	80
Upset hex. head cap screws, U.S.S. thread,	80, 10 and 10
Upset hex. cap screws, S.A.E. thread,	80, 10 and 10
Upset set screws	80, 10 and 5
Milled studs	70 and 5

Co. The McClintic-Marshall Co. has been awarded 1200 tons for still supports by the Standard Oil Co. of Indiana.

The mill quotation on plain material is 2.10c. per lb. base, Chicago.

Wire Products.—The volume of orders from the jobbing trade is being well maintained, and mills are encouraged by the inquiry that is now coming from railroad car builders. The railroads have been liberal buyers of fencing and nails throughout the past year, and current orders are holding up well, particularly from systems operating in the South.

Bars.—The demand for soft steel bars is slowly expanding. Forward buying is gaining ground, but large users, who are specifying against old contracts, are still offering resistance to the present price. The demand for alloy steel bars has increased, and Chicago producers are operating at 75 per cent of capacity, which is an advance from the low point of 65 per cent late in November. The rail steel bar market is quiet, and specifications are in smaller volume than a year ago. The mill of the Calumet Steel Co. will be down during the first 10 days of January.

Mill prices per lb. are: Mild steel bars, 2.10c., base, Chicago; common bar iron, 2c. base, Chicago; rail steel bars, 1.90c. to 2c., base, Chicago.

Sheets.—Both specifications and spot buying have increased, and deliveries have extended to three to five weeks, depending upon the product. More active inquiry for forward requirements is coming from the Northwest. Many orders that were held up in October and November by the automotive trade have been released for January delivery. The Milwaukee mills of the Inland Steel Co. resumed operations Jan. 3. Sheet mill production in this district during December averaged 80 per cent of capacity.

Chicago delivered prices from mill are 3.25c. for No. 24 black; 2.55c. for No. 10 blue annealed; 4.10c. for No. 24 galvanized. Delivered prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than the Chicago delivered prices.

Rails and Track Supplies.—This market is quiet except for inquiry for track accessories. Railroads are pressing rail mills for deliveries, and producers expect to increase the rate of rolling at an early date. An Eastern railroad with a terminal in Chicago has placed 5000 tons of iron tie plates.

Standard Bessemer and open-hearth rails, $43; light rails, rolled from billets, $36 to $38 per gross ton, f.o.b. maker's mill.

Standard railroad spikes, 2.90c. per lb. mill; track bolts with square nuts, 3.90c. mill; steel tie plates, 2.35c. mill; angle bars, 2.75c. mill.

Reinforcing Bars.—Awards are light, but dealers believe that much of the outstanding business is alive and that it will be placed. Architects in Chicago are busy on new projects, many of which have been financed. Dealers are making an effort to hold billet steel reinforcing bars out of warehouse to the minimum of 2.30c., but there are still many quotations outstanding at 2.25c.

Bolts, Nuts and Rivets.—Prices are steady, and specifications are being received at the average rate of December.

Cast Iron Pipe.—Prices are weak. Orders are being taken in this territory at $37 to $38, base Birmingham, for 6-in. and larger diameters. The higher figure is holding for prompt delivery of small orders, while the quotation of $37 is being used to attract business for winter manufacture. Minneapolis has placed 1700 tons of 6 to 24-in. centrifugal pipe with the American Cast Iron Pipe Co. Ellettsville, Ind., is in the market for 105 tons of 4-in., 100 tons of 6-in. and 5 tons of 8-in., all Class B pipe. A filtration plant at Waukegan, Ill., calls for 600 tons.

We quote per net ton, delivered, Chicago, as follows: Water pipe, 4-in., $49.20 to $50.20; 6-in. and over, $45.20 to $46.20; Class A and gas pipe, $4 extra.

Old Material.—The market is quiet except for small purchases by dealers who are anxious to cover old contracts. Railroad shipments are slowing down, and little distress tonnage is appearing on track. A user has taken 1000 tons of cast iron wheels at $15.25 per gross ton, delivered, and a round tonnage of re-rolling rails has been purchased at $16.75, delivered. A melter in Chicago is in the market for malleable scrap, and a user in Milwaukee is inquiring for low phosphorus grades.

We quote delivered in consumers' yards, Chicago and vicinity, all freight and transfer charges paid for all items, except relaying rails, including angle bars to match, which are quoted f.o.b. dealers' yards:

Per Gross Ton	
Heavy melting steel	$13.00 to $13.50
Frogs, switches and guards, cut apart, and miscellaneous rails	14.50 to 15.00
Shoveling steel	13.00 to 13.50
Hydraulic compressed sheets	11.50 to 12.00
Drop forge flashings	9.50 to 10.00
Forged cast and rolled steel carwheels	16.50 to 17.00
Railroad tires, charging box size	17.50 to 18.00
Railroad leaf springs, cut apart	16.50 to 17.00
Steel couplers and knuckles	15.50 to 16.00
Coil springs	17.25 to 17.75
Low phosphorus punchings	15.50 to 16.00
Axle turnings, foundry grade	13.00 to 13.50
Axle turnings, blast fur. grade	11.00 to 11.50
Relaying rails, 56 to 60 lb	25.50 to 26.50
Relaying rails, 65 lb. and heavier	26.00 to 31.00
Rerolling rails	16.25 to 16.75
Steel rails, less than 3 ft	16.50 to 17.00
Iron rails	13.50 to 14.00
Cast iron borings	9.75 to 10.25
Short shoveling turnings	9.75 to 10.25
Machine shop turnings	6.50 to 7.00
Railroad malleable	16.00 to 16.50
Agricultural malleable	15.00 to 15.50
Angle bars, steel	15.25 to 15.75
Cast iron carwheels	15.00 to 15.50
Per Net Ton	
No. 1 machinery cast	16.50 to 17.00
No. 1 railroad cast	15.50 to 16.00
No. 1 agricultural cast	15.50 to 16.00
Stove plate	14.00 to 14.50
Grate bars	13.50 to 14.00
Brake shoes	13.00 to 13.50
Iron angle and splice bars	14.00 to 14.50
Iron arch bars and transoms	18.75 to 19.25
Iron car axles	22.00 to 22.50
Steel car axles	17.50 to 18.00
No. 1 railroad wrought	12.00 to 12.50
No. 2 railroad wrought	11.50 to 12.00
No. 1 busheling	10.50 to 11.00
No. 2 busheling	6.25 to 6.75
Locomotive tires, smooth	16.50 to 17.00
Pipes and flues	9.00 to 9.50

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Mild steel bars	3.00c.
Reinforcing bars, billet steel	2.25c. to 2.60c.
Cold-finished steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Hoops	4.15c.
Bands	3.65c.
No. 24 black sheets	3.95c.
No. 10 blue annealed sheets	3.50c.
No. 24 galvanized sheets	4.80c.
Standard railroad spikes	3.55c.
Track bolts	4.55c.
Structural rivets	3.50c.
Boiler rivets	3.70c.
	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	47½
Coach or lag screws	55 and 5
Hot-pressed nuts, squares, tapped or blank	3.25c. off per lb.
Hot-pressed nuts, hexagons, tapped or blank	3.75c. off per lb.
No. 8 black annealed wire, per 100 lb	$3.30
Common wire nails, base per keg	3.05
Cement coated nails, base per keg	3.05

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Tank steel plates, ¼-in. and heavier	2.80c. to 3.00c.
Tank steel plates, ⅜-in.	3.00c. to 3.20c.
Structural shapes	2.75c. to 3.00c.
Soft steel bars, small shapes and iron bars (except bands)	3.00c. to 3.20c.
Round-edge iron	3.50c.
Round-edge steel, iron finished, 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforcing steel bars, square, twisted and deformed	3.00c.
Cold-finished steel, rounds and hexagons	4.00c.
Cold-finished steel, squares and flats	4.50c.
Steel hoops	4.00c. to 4.25c.
Steel bands, No. 12 gage to ⅛-in., inclusive	3.75c. to 3.90c.
Spring steel	5.00c.
No. 24 black sheets	4.35c.
No. 10 blue annealed sheets	3.50c.
No. 24 galvanized sheets	5.30c.
Diamond pattern floor plates—	
¼-in.	5.30c.
⅜-in.	5.50c.
Rails	3.20c.
Tool steel	8.50c.
Swedish iron bars	6.60c.

Philadelphia

Pig Iron Prices Weaken—Slightly Better Ordering of Steel—Large Scrap Sales

PHILADELPHIA, Jan. 4.—Eastern steel mills started the new year with slightly improved rolling schedules as compared with December, but the volume of new business is not sufficient to indicate that January as a whole will show more than a moderate gain over last month. Opinion in the local steel trade is that two or three weeks must elapse before definite signs of any upturn in demand will become evident.

The outstanding characteristics of the market are: A weakening in pig iron prices; a continued weak scrap market despite large sales of heavy melting steel; a demoralized condition in the structural steel situation due largely to keen competition among fabricators for tonnage, with little of it available even at low prices; an improving demand for ferromanganese with a withdrawal from the market by a leading producer.

Pig Iron.—A weakening in pig iron prices marked the close of the year. A sale of 5000 tons of basic iron to a steel maker at $21.50, delivered, was a decline of 50c. a ton on this grade, and foundry iron has also been sold at $21.50, furnace, for the base grade, likewise a 50c. decline. The outstanding inquiry of the week was for about 10,000 tons for the plants of the National Radiator Co. at Trenton, N. J., and Johnstown, Pa. On about 6000 tons for the Trenton plant eastern Pennsylvania furnaces came into competition with a New York State furnace, which quoted less than $22.50, delivered. Some of the prices named by furnaces of this district were higher. Only a part of the tonnage has been placed, but the remaining orders are expected this week. The foundry iron market of this district may fairly be quoted at $21.50 to $22, furnace, for the base grade. Not all furnaces have gone as low as $21.50, but the tendency of prices is decidedly weaker. Sales of the week included 3000 tons of low phosphorus iron to the Standard Steel Works Co., Burnham, Pa., and two lots of pipe iron totaling 4500 tons. The Keystone furnace of the Reading Iron Co. at Reading, Pa., which has been out of blast since last May, has gone in.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76c. to $1.63 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$22.26 to $22.76
East Pa. No. 2X, 2.25 to 2.75 sil.	22.76 to 23.76
East Pa. No. IX	23.26 to 24.26
Basic delivered eastern Pa.	21.50 to 22.00
Gray forge	21.50 to 22.00
Malleable	23.00 to 23.50
Standard low phos. (f.o.b. New York State furnace)	24.00 to 25.00
Copper bearing low phos. (f.o.b. furnace)	25.00 to 26.00
*Virginia No. 2 plain, 1.75 to 2.25 sil.	27.67 to 28.67
*Virginia No. 2X, 2.25 to 2.75 sil.	28.17 to 29.17

*The freight rate from Virginia furnaces to Philadelphia is $5.17 per gross ton.

Ferromanganese.—The Bethlehem Steel Co., having taken large orders for ferromanganese for first half, has withdrawn from the market. The Lavino Furnace Co. continues to sell at $100, seaboard. Small lots of British ferromanganese have been sold at the same price.

Plates.—Orders for plates were received in fair volume by Eastern mills during the past week, and operations this week are up to, if not in excess of, December rollings. The Lukens Steel Co. has gone on an 8-hr. basis of three shifts a day. Quotations continue at 1.90c., Pittsburgh.

Structural Shapes.—With structural steel construction work at a minimum, local fabricators are competing keenly for such orders as are up for bids. Fabricated steel prices are said to be considerably below costs of production in most instances. This situation is reflected to some extent on mill prices for plain material. While some mills maintain quotations of 1.90c. to 2c., Pittsburgh, other mills are making sales at delivered prices equal to 1.80c. to 1.90c., Pittsburgh. The leading Eastern producer reports that its December bookings were ahead of those of November.

Bars.—Mill rollings of steel bars dropped off considerably in December, but there has been a slight pick-up with the beginning of the new year. As with other steel products, the demand of consumers is for quick deliveries. Orders are usually small. Mills continue to quote 2c., Pittsburgh. Bar iron is quoted by Eastern mills at 2.22c., Philadelphia.

Sheets.—Very little sheet buying has been done in the last week; consequently it is difficult to determine to what extent, if any, price concessions have lessened. On the small orders some mills are averse to making any concession, and current business is chiefly made up of small lots. Usual quotations are 2.30c. for blue annealed, 3c. for black and 3.85c. for galvanized sheets, Pittsburgh base. Concessions of $1 and $2 a ton have been allowed.

Imports.—Pig iron receipts at Philadelphia in the last week of 1926 were only 305 tons, of which 200 tons came from the Netherlands and 105 tons from Sweden. Other imports were: Iron ore from Algeria, 5000 tons; structural steel from Belgium, 1245 tons; structural steel from the Netherlands, 29 tons; steel ingots from Sweden, 7 tons; blooms from France, 80 tons; cast iron pipe from Belgium, 19 tons.

Old Material.—A steel company which recently made a purchase of heavy melting steel at $15.75 has continued its buying, and in all has ordered close to 20,000 tons, paying $16, delivered, on the bulk of the tonnage. Another steel company, which bought about 5000 tons, also paid $16, delivered. Yet these two purchases have not produced the usual effect of strengthening the market. On the contrary, the fact that these consumers are now out of the market for a time has removed whatever hope the scrap trade may have entertained for an early rise in prices. On scrap items other than heavy melting steel, the price changes, where any have occurred, are downward.

We quote for delivery, consuming points in this district, as follows:

No. 1 heavy melting steel	$15.50 to $16.00
Scrap rails	15.50 to 16.00
Steel rails for rolling	17.00 to 17.50
No. 1 low phos., heavy, 0.04 per cent and under	20.00 to 21.00
Couplers and knuckles	18.50
Rolled steel wheels	18.50
Cast iron carwheels	16.50 to 17.00
No. 1 railroad wrought	17.00 to 17.50
No. 1 forge fire	13.00 to 13.50
Bundled sheets (for steel works)	12.50 to 13.00
Mixed borings and turnings (for blast furnace)	12.50 to 13.00
Machine shop turnings (for steel works)	12.50 to 13.00
Machine shop turnings (for rolling mill)	13.00
Heavy axle turnings (or equivalent)	14.00 to 14.50
Cast borings (for steel works and rolling mill)	13.00 to 13.50
Cast borings (for chemical plant)	15.00 to 16.00
No. 1 cast	17.00 to 17.50
Heavy breakable cast (for steel works)	16.00 to 16.50
Railroad grate bars	12.50 to 13.00
Stove plate (for steel works)	12.50 to 13.00
Wrought iron and soft steel pipes and tubes (new specifications)	14.00 to 14.50
Shafting	21.00 to 22.00
Steel axles	23.00 to 24.00

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and structural shapes	3.40c.
Bars, mild steel or iron	3.30c.
Reinforcing bars	3.30c.
Hoops	4.00c. to 4.25c.
Bands	3.95c.
Cold-finished rounds and hexagons	3.85c.
Squares	4.35c.
Open-hearth spring steel	4.75c. to 5.00c.
No. 24 black sheets	4.05c.
No. 10 blue annealed sheets	3.60c.
No. 24 galvanized sheets	4.90c.
Structural rivets	3.75c.
Small rivets	65 per cent off list
No. 9 annealed wire, per 100 lb	$3.00
Common wire nails, base per keg	2.95
Cement coated nails, base per 100-lb. keg	3.15
Chain, per 100 lb	7.55
	Net per 100 Ft.
Lap welded steel boiler tubes, 2-in.	$18.00
4-in.	38.00
Seamless steel boiler tubes, 2-in.	19.00
4-in.	39.00

Cincinnati

Pig Iron Competition Keener with Lake Furnaces Active in Southern Ohio

CINCINNATI, Jan. 4.—With several important pig iron buyers entering the market and with indications of an increasing demand from consumers in the immediate future, competition among producers has become more intense. A Lake furnace has taken upward of 6000 tons of foundry iron for a southern Ohio company at about $18, base, Cleveland, and a local melter is reported to have contracted with a northern Ohio seller for a sizable tonnage. Considerable Lake iron is moving into Indiana on contracts closed in October and November. In addition, a Granite City, Ill., producer is understood to be soliciting business in Indiana, its output not being entirely absorbed in the St. Louis district. Southern Ohio furnaces are holding to $20, base furnace, and in the past week have permitted attractive tonnages to go outside of this territory rather than quote under that figure. In the belief that melters will make liberal purchases of iron in the next few weeks, local dealers are aggressively canvassing the market. The price of Jackson County silvery iron is undisturbed at $28.50, base, furnace, for 8 per cent, whereas a week ago producers were asking $1 a ton more for delivery after Jan. 1. There is no change in Southern iron, which remains at $20, base Birmingham.

Based on freight rates of $3.69 from Birmingham and $1.89 from Ironton, we quote f.o.b. Cincinnati:

Alabama fdy., sil. 1.75 to 2.25 (base)	$23.69
Alabama fdy., sil. 2.25 to 2.75	24.19
Tennessee fdy., sil. 1.75 to 2.25	23.69
Southern Ohio silvery, 8 per cent	30.39
So. Ohio fdy., sil. 1.75 to 2.25	21.89
So. Ohio malleable	21.39

Finished Material.—Both producers and consumers marked time in the past week, and consequently specifications and orders were meager. Some mills believed that the last week of the quarter would bring out liberal bookings, but the ability of buyers to obtain quick delivery without danger of higher prices obviated the necessity of anticipating future needs to any considerable extent. Quotations on all products, with the exception of sheets, have been maintained without change. Galvanized and black sheets are selling at 3.80c. and 2.90c., base Pittsburgh, respectively. The demand for blue annealed sheets at 2.30c., base Pittsburgh, has been light. Gas holder fabricators have taken sizable tonnages in the last two weeks and are comfortably booked ahead.

Reinforcing Bars.—The award in the past week of 1200 tons of new billet bars for the addition to the Union Central Life Insurance Building, Cincinnati, is reported to have been made at prices considerably under 2c., base Pittsburgh. Rail steel bars are quoted at 1.90c., base mill, although this price also is not being firmly maintained.

Warehouse Business.—A fairly good demand for bars and structural steel in the past few weeks brought the December volume of business up to a moderate level. In fact, sales were about 10 to 15 per cent greater than in the same month in 1925. Prices are unchanged.

Coke.—The market is weak. Specifications for by-product foundry coke in the past month showed a decrease of about 20 per cent compared with those in the previous month, and little improvement is anticipated in January. By-product foundry coke in Michigan is bringing $11.25, delivered Detroit, and $10.50, Detroit ovens, for outside shipment. In the Wise County district, where a wage decrease became effective Jan. 1, at least one producer has made a cut of 50c. a ton both on foundry and furnace coke, the quotation on the former at present being $5 to $5.50 and on the latter $4.60 to $5.

Based on freight rates of $2.14 from Ashland, Ky., and $2.59 from Wise County ovens and New River ovens, we quote f.o.b. Cincinnati: Wise County foundry, $7.59 to $8.09; New River foundry, $10.09 to $10.59; by-product foundry, $10.14.

Old Material.—The situation is unchanged. Mill buying is not expected to get under way before Jan. 15, although a fair amount of material is being accepted on contract by steel plants near by. The Big Four has a list totaling approximately 3100 tons, including 1250 tons of No. 1 heavy melting steel, closing this week. Prices quoted below are nominal.

We quote dealers' buying prices, f.o.b. cars, Cincinnati:

Per Gross Ton	
Heavy melting steel	$12.50 to $13.00
Scrap rails for melting	12.50 to 13.00
Short rails	17.50 to 18.00
Relaying rails	26.50 to 27.00
Rails for rolling	14.00 to 14.50
Old carwheels	12.00 to 12.50
No. 1 locomotive tires	16.50 to 17.00
Railroad malleable	14.50 to 15.00
Agricultural malleable	13.50 to 14.00
Loose sheet clippings	7.00 to 7.50
Champion bundled sheets	8.50 to 9.00
Per Net Ton	
Cast iron borings	7.50 to 8.00
Machine shop turnings	7.00 to 7.50
No. 1 machinery cast	17.00 to 18.00
No. 1 railroad cast	14.00 to 14.50
Iron axles	19.50 to 20.00
No. 1 railroad wrought	9.00 to 9.50
Pipes and flues	7.50 to 8.00
No. 1 busheling	9.00 to 9.50
Mixed busheling	5.50 to 6.00
Burnt cast	6.50 to 7.00
Stove plate	9.00 to 9.50
Brake shoes	9.50 to 10.00

New York

Decline in Pig Iron—Subway Contract Calls for 23,000 Tons of Steel

NEW YORK, Jan. 4.—In view of the diverting influence of the holidays, sales of pig iron during the past week were of surprising proportions, totaling close to 7000 tons. Moreover, the opening of the new year has brought out several new inquiries. The Worthington Pump & Machinery Corporation has entered the market for a total of 1200 tons for January and February delivery at Harrison, N. J. The inquiry calls for 200 tons each of No. 2X and No. 2 plain and 800 tons of No. 1X. Since this company was thought to have covered its needs for first quarter, its interest in additional tonnage is interpreted as reflecting an increase in its business. The Delaware & Hudson Co. is inquiring for 200 tons of No. 2X for shipment to Watervliet, N. Y. Competition for tonnage now before the trade is keen. An inquiry for 7500 tons by a Trenton, N. J., radiator manufacturer developed quotations of as low as $21.50, base eastern Pennsylvania furnace, on foundry iron. So far this buyer has placed only 1000 tons. The General Electric Co. has placed 400 tons against its inquiry for 500 tons of No. 2 plain for Bayway, N. J. The Port Henry, N. Y., furnace that was down for repairs went into blast Dec. 28.

We quote per gross ton delivered in the New York district as follows, having added to furnace prices $1.39 to $2.52 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.54 from Virginia:

East. Pa. No. 2 fdy., sil. 1.75 to 2.25	$22.89 to $24.02
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	23.39 to 24.52
East. Pa. No. 1X fdy., sil. 2.75 to 3.25	23.89 to 25.02
Buffalo fdy., sil. 1.75 to 2.25 (all rail)	22.91 to 23.91
No. 2 Virginia fdy., sil. 1.75 to 2.25	27.54 to 28.04

Warehouse Business.—With the holidays ended, a fair volume of purchasing from stock is reported, with small lots of structural material, plates, and black and galvanized sheets moving. Prices continue firm, with little evidence of shading.

Cast Iron Pipe.—The year is beginning with considerable business in prospect, and a good tonnage was booked during the final week of 1926. The American Light & Traction Co., New York, has closed on about 28,000 tons of gas pipe for delivery during the year. Yonkers, N. Y., will open bids, Jan. 5, on about 200 tons of water pipe, and Baltimore will open bids, also on Jan. 5, on about 1200 tons of water pipe. Boston has opened bids on about 3000 tons of 6-in. to 16-in. water pipe, and B. Nicoll & Co., New York, representing a

Continental maker, were low, with the Warren Foundry & Pipe Co. next. Inquiries for gas pipe from the United Gas Improvement Co., Philadelphia, and the Consolidated Gas Co., New York, are still open. Prices continue soft, but the downward tendency is less in evidence. Hodenpyl, Hardy & Co., 14 Wall Street, New York, have closed on several thousand tons of gas pipe.

We quote pressure pipe per net ton, f.o.b. New York in carload lots, as follows: 6-in. and larger, $48.60 to $50.60; 4-in. and 5-in., $53.60 to $55.60; 3-in., $63.60 to $65.60; with $5 additional for Class A and gas pipe.

Finished Material.—The close of the year brought some acceleration in buying. Makers of track supplies were able to report December as one of the best months on record. Production in general was at a slightly slower rate in December than in the months preceding, but there was no appreciable falling off in the last week, and new orders were taken at a somewhat better volume than has prevailed recently. Sheets continue to show weakness, but most of the new business is being taken at 3c., 3.85c. and 2.30c., Pittsburgh, on black, galvanized and blue annealed sheets respectively. These prices are being shaded occasionally from $1 to $2 a ton. Bars are quiet, and mill operations during December showed a sharp decrease from November. Prices remain at 2c. Pittsburgh. Car buying is supplying good plate business, and prices are firm at 1.90c., Pittsburgh. There is little new buying in wire products or in pipe. Many projects under negotiation indicate higher activity in structural shapes during January. A leading fabricator reports a larger volume of business under estimate than it has had at any time for years. Competition continues to bring out low bids from fabricators. Two more sections of the subway, requiring 23,000 tons, have been taken by the American Bridge Co., and inquiries have come out on an office building for the State of New York in Albany, which will require 9000 tons. The Missouri Pacific has ordered 2000 freight cars, and the Baltimore & Ohio is inquiring for 90 steel coaches.

Old Material.—All grades are unchanged, with the market as a whole showing little activity. No. 1 heavy melting steel is still being purchased at $15.50 per ton, delivered eastern Pennsylvania, with tonnage moving to consumers at Conshohocken, Coatesville and Bethlehem, Pa., and Claymont, Del. Blast furnace material continues moderately active, with prices unchanged. Eastern Pennsylvania consumers of scrap are reported as extremely severe in their inspection.

Buying prices per gross ton, New York, follow:

Heavy melting steel (yard)	$9.25 to $9.75
Heavy melting steel (railroad or equivalent)	11.75 to 12.85
Rails for rolling	12.50 to 13.00
Steel car axles	18.50 to 19.00
Iron car axles	24.00 to 24.50
No. 1 railroad wrought	13.00 to 14.00
Forge fire	9.25 to 9.75
No. 1 yard wrought, long	12.00 to 13.00
Cast borings (steel mill)	9.25 to 9.75
Cast borings (chemical)	13.00 to 13.50
Machine shop turnings	9.25 to 9.75
Mixed borings and turnings	9.25 to 9.75
Iron and steel pipe (1 in. diam., not under 2 ft. long)	9.75 to 10.25
Stove plate (steel mill)	9.25 to 9.75
Stove plate (foundry)	11.00 to 11.50
Locomotive grate bars	10.25 to 10.75
Malleable cast (railroad)	15.50 to 16.00
Cast iron carwheels	12.00 to 12.50
No. 1 heavy breakable cast	11.75 to 13.00

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

No. 1 machinery cast	$16.00 to $16.50
No. 1 heavy cast (columns, building materials, etc.), cupola size	14.50 to 15.00
No. 2 cast (radiators, cast boilers, etc.)	13.50 to 14.00

Coke.—Quotations still cover a wide range, with a given price largely a result of the wage scale being paid. Ovens using coal mined on the low wage scale offer spot tonnages of standard foundry coke at $4.25 to $4.75 per ton, Connellsville, and prompt shipment furnace coke at $3.25 to $3.50. Those operating on coal mined under the higher wage scale are maintaining as high as $5.50 to $6.25 per ton, Connellsville, on foundry and $4.25 to $4.75 per ton for furnace grade. Spot shipment Connellsville foundry coke is quotable as follows: To northern New Jersey, $8.28 to $9.28 per ton; New York or Brooklyn, $9.04 to $10.04 per ton; Newark or Jersey City, N. J., $8.16 to $9.16 per ton. By-product foundry coke continues at $10.59 to $11.77 per ton, delivered Newark or Jersey City, N. J.

Boston

Past Year Shows Decline in Pig Iron Imports—Scrap Quiet

BOSTON, Jan. 4.—The Mystic Iron Works reports sales of more than 1000 tons of No. 2 plain to No. 1X iron at prices ranging up to $23 a ton at furnace, but otherwise business in the last week in 1926 was confined to a few car lots of Buffalo iron at $18 to $19, base furnace, and similar lots of New York State at delivered prices equivalent to those on Buffalo metal. Virtually no eastern and western Pennsylvania, Virginia and Alabama iron was moved. No open inquiries are in the market, and current business is the result

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.34c.
Soft steel bars and small shapes	3.24c.
Iron bars	3.24c.
Iron bars, Swedish charcoal	7.00c. to 7.25c.
Cold-finished steel shafting and screw stock—	
Rounds and hexagons	4.00c.
Flats and squares	4.50c.
Cold-rolled strip, soft and quarter hard	6.25c.
Hoops	4.49c.
Bands	3.99c.
Blue annealed sheets (No. 10 gage)	3.89c.
Long terne sheets (No. 24 gage)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galvanized annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases	4.50c. to 7.00c.

	Per Cent Off List
Machine bolts, cut thread	40 and 10
Carriage bolts, cut thread	30 and 10
Coach screws	40 and 10

Boiler Tubes—	Per 100 Ft.
Lap welded steel, 2-in.	$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
¼-in. butt	46	29
⅜-in. butt	51	37
½-in. butt	53	39
2½-6-in. lap	48	35
7 and 8 in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
¼-in. butt	4	+19
⅜-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	4.15c.
No. 22	4.30c.
No. 24	4.35c.
No. 26	4.45c.
No. 28*	4.60c.
No. 30	4.85c.

Sheets, Galvanized

	Per Lb.
No. 14	4.50c. to 4.75c.
No. 16	4.60c. to 4.85c.
No. 18	4.75c.
No. 20	4.90c.
No. 22	4.95c.
No. 24	5.10c.
No. 26	5.35c.
No. 28*	5.60c.
No. 30	6.00c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

of solicitation. Furnaces in all districts report New England foundries as taking iron per schedule, with possibly a half dozen unimportant exceptions.

We quote delivered prices per gross ton to most New England points as follows, having added $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia, and $6.91 to $8.77 from Alabama:

East. Penn., sil. 1.75 to 2.25	$25.65 to $26.15
East. Penn., sil. 2.25 to 2.75	26.15 to 26.65
Buffalo, sil. 1.75 to 2.25	22.91 to 23.91
Buffalo, sil. 2.25 to 2.75	23.41 to 24.41
Virginia, sil. 1.75 to 2.25	28.42 to 29.92
Virginia, sil. 2.25 to 2.75	28.92 to 30.42
Alabama, sil. 1.75 to 2.25	26.91 to 28.77
Alabama, sil. 2.25 to 2.75	27.41 to 29.27

Imports.—Imports of pig iron for December consisted of 817 tons of Dutch and 254 tons of German, a total of 1071 tons, the smallest for any month in 1926. Receipts of foreign iron at Boston by months in 1926 and 1925, in tons, follow:

	1926	1925	Decrease
January	4,061	8,212	4,151
February	10,659	13,701	3,042
March	10,810	11,365	555
April	6,332	6,167	*165
May	3,979	6,179	2,200
June	4,936	7,967	3,031
July	2,423	4,869	2,446
August	6,347	8,248	1,901
September	2,805	6,747	3,942
October	1,801	6,264	4,463
November	2,310	7,137	4,827
December	1,071	3,765	2,694
Totals	57,534	90,621	33,087

*Increase.

Coke.—New England makers of by-product foundry coke announce that January deliveries on first half contracts will be at $13.50 a ton, delivered, within a $3.10 freight rate zone, or the same as on December deliveries. Both producers report a slight improvement in the demand for foundry coke in the closing days of 1926, and a big increase in the demand for domestic fuel. Connellsville district foundry coke is still available at delivered prices $1 a ton or more under those on New England coke, with little buying.

Cast Iron Pipe.—Boston opened bids Dec. 30 on 3000 tons of 6 to 16-in. pipe. The Warren Foundry & Pipe Co. was the low American bidder. B. Nicoll & Co., acting for a European maker, submitted a bid of $3.35 a ton under that of the Warren Foundry & Pipe Co. No award has been made. Boston has awarded the Warren Foundry & Pipe Co. 200 tons of fittings, bids on which were opened Dec. 31. One of the large New England gas companies has purchased 5000 tons of pipe. Prices quoted openly on domestic pipe are: 4-in., $59.10 a ton, delivered common Boston freight rate points; 6 to 12-in., $54.10 to $55.10; larger pipe, $53.10 to $54.10. A $5 differential is asked on Class A and gas pipe.

Old Material.—Quotations on old material are virtually unchanged from a week ago. Current buying is at a minimum. Although ingot production in this country for 1926 was larger than that for 1925, it is generally estimated that shipments of scrap out of New England showed little increase. Dealers report that average prices obtained for scrap compare favorably with those for 1925 but, in view of the fact that they themselves paid more for material, net profits for 1926 were small.

The following prices are for gross-ton lots, delivered at consuming points:

Textile cast	$18.00 to $19.00
No. 1 machinery cast	18.00 to 18.50
No. 2 machinery cast	16.50 to 17.00
Stove plate	13.00 to 13.25
Railroad malleable	18.50 to 19.00

The following prices are offered per gross-ton lots, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$10.50 to $11.00
No. 1 railroad wrought	12.00 to 12.25
No. 1 yard wrought	11.00 to 11.25
Wrought pipe (1 in. in diameter, over 2 ft. long)	9.00 to 9.50
Machine shop turnings	7.50 to 8.00
Cast iron borings, chemical	10.50 to 11.00
Cast iron borings, rolling mill	8.00 to 8.50
Blast furnace borings and turnings	8.00 to 8.50
Forged scrap	8.00 to 8.50
Bundled skeleton, long	8.00 to 8.50
Forged flashings	8.00 to 8.50
Shafting	15.50 to 16.00
Street car axles	16.00 to 16.50
Rails for rerolling	12.00 to 12.50
Scrap rails	10.50 to 11.00

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Soft steel bars and small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway, rounds	6.60c.
Norway, squares and flats	7.10c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Plates	3.365c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tire steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hexagons	4.05c.
Squares and flats	4.55c.
Toe calk steel	6.00c.

San Francisco

Southern Pacific to Build 1200 Cars—Jobbers Advance Steel Pipe

SAN FRANCISCO, Dec. 31 (*By Air Mail*).—Outstanding developments of the week have been a letting of 1900 tons of fabricated steel for a fiber plant at Longview, Wash., taken by Poole & McGonigle, Portland, Ore., an advance of 2½ per cent in local jobbers' out-of-stock quotations on steel pipe and an announcement that the Southern Pacific Co., San Francisco. will build eight mountain-type locomotives, 500 box cars, 650 flat cars and 50 cabooses in its shops at Los Angeles and Sacramento, Cal. The total cost of this work will be $2,416,000. A referendum on a bond issue of $24,000,000 will be held in the near future by the San Joaquin River Water Storage District, Los Banos, Cal. About $14,000,000 of the proposed bond issue will be used for the construction of what will be known as the Friant dam and power house. The project embraces 500,000 acres in Merced, Madera, Fresno and Stanislaus Counties.

Pig Iron.—While the larger part of first quarter business has been booked, there are still several buyers who have not closed for their requirements. It is understood that contracts for the first quarter are somewhat smaller than they were one year ago. Quotations are unchanged.

	Per Gross Ton
*Utah basic	$25.00 to $26.00
*Utah foundry, sil. 2.75 to 3.25	25.00 to 26.00
**Indian foundry, sil. 2.75 to 3.25	25.00
**German foundry, sil. 2.75 to 3.25	24.25

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Shapes.—Fabricated steel lettings for the week total 2455 tons. Fresh inquiry is negligible, although plans are being prepared for several good-sized jobs that are expected to come up for bids early in the new year. Eastern mills continue to quote plain material at 2.35c., c.i.f. Coast ports.

Plates.—Bids are being taken by the Board of Public Utilities Commissioners, Riverside, Cal., on 600 tons for a pipe line, and the East Bay Water Co., Oakland, Cal., will soon call for new bids on 650 tons. The Standard Oil Co. of California, San Francisco, has

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and structural shapes	3.30c.
Mild steel bars and small angles	3.30c.
Small channels and tees, ¾-in. to 2¾-in.	3.90c.
Spring steel, ¼-in. and thicker	5.00c.
No. 24 black sheets	4.90c.
No. 28 black sheets	5.15c.
No. 10 blue annealed sheets	4.00c.
No. 24 galvanized sheets	5.65c.
No. 28 galvanized sheets	6.15c.
Common wire nails, base per keg	$2.75
Cement coated nails, 100-lb. keg	3.75
Cement coated nails, count keg	3.00

placed 400 tons with two Eastern mills. Only 370 tons of steel was bought by Yakima, Wash., for its pipe line, as the larger part of it will be wood-stave and cast iron pipe. The Western Pipe & Steel Co., San Francisco, took the steel contract. Price shading in plates attracted some attention during the past week, although it has not been general. While most of the Eastern mills continue to quote 2.30c., c.i.f. Coast ports, 2.25c. is understood to have been named by more than one seller.

Bars.—Local bar jobbers have not yet announced their quotations for first quarter business. Lettings in concrete bars have been small, and locally fresh inquiries are unimportant. In San Diego, Cal., construction work on the Sutherland dam will require 525 tons to 1277 tons.

Cast Iron Pipe.—Yakima, Wash., awarded about 1000 tons of cast iron pipe for a pipe line to the American Cast Iron Pipe Co. Spokane, Wash., placed 543 tons with the United States Cast Iron Pipe & Foundry Co., and Portland, Ore., let 150 tons of special castings to the American Cast Iron Pipe Co. Two projects at Seattle, Wash., will require 713 tons; Dayton, Wash., is inquiring for 200 tons, and Astoria, Ore., will call for bids shortly on 500 tons. Quotations are unchanged at $49 to $50, base, f.o.b. dock, San Francisco.

Tin Plate.—The Red Salmon Packing Co., San Francisco, is inquiring for 6000 to 7000 base boxes.

Warehouse Business.—Local jobbers have advanced their quotations on steel pipe 2½ per cent.

Coke.—Two local importers have shipments of German by-product coke en route, which are expected to arrive here in January. Quotations are nominal and subject to conditions prevailing at the time of sale.

St. Louis

Railroad Buys Steel for 500 Automobile Cars—Pig Iron Demand Lags

ST. LOUIS, Jan. 4.—New business in pig iron has been light, and shipments have been suspended on old contracts by a number of melters who wish to hold down their inventories. This has caused a temporary weakness of the market, although generally quoted prices are unchanged. A new buying movement and substantial releases of iron for shipment during the first weeks of January are expected. The St. Louis Coke & Iron Corporation sold about 7000 tons of foundry iron during the week to Indiana and Iowa melters.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.16 freight from Chicago, $4.42 from Birmingham, all rail, and 81c. average switching charge from Granite City:

Northern fdy., sil. 1.75 to 2.25	$22.16
Northern malleable, sil. 1.75 to 2.25	22.16
Basic	22.16
Southern fdy., sil. 1.75 to 2.25	24.42
Granite City iron, sil. 1.75 to 2.25	$22.31 to 22.81

Coke.—The demand for foundry coke has fallen off considerably, but a revival of buying and heavier specifications are expected early in the year.

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and structural shapes	3.25c.
Bars, mild steel or iron	3.15c.
Cold-finished rounds, shafting and screw stock	3.75c.
No. 24 black sheets	4.45c.
No. 10 blue annealed sheets	3.60c.
No. 24 galvanized sheets	5.25c.
Black corrugated sheets	4.65c.
Galvanized corrugated sheets	5.30c.
Structural rivets	3.65c.
Boiler rivets	3.85c.
	Per Cent Off List
Tank rivets, ⅞-in. and smaller	70
Machine bolts	50 and 5
Carriage bolts	47½
Lag screws	55 and 5
Hot-pressed nuts, square, blank or tapped	3.25c. off per lb.
Hot-pressed nuts, hexagons, blank or tapped	3.75c. off per lb.

Finished Iron and Steel.—The Missouri-Kansas-Texas Railroad has purchased from a Chicago mill the steel required for 500 automobile box cars, which the road will build in its own shops. This line also is in the market for its requirements in steel castings—300 tons—for the first half of 1927. The Missouri Pacific Railroad and the Wabash Railway are in the market for their first half requirements in track bolts and spikes. The Laclede Steel Co. has received an order for 350 tons of reinforcing bars for the St. Louis High School stadium. Structural business is quiet.

Old Material.—The market continues strong, with dealers' hopes for higher prices the basis for strength. Consumers are still waiting for large prospective orders for railroad cars to materialize and are buying hardly anything. Prices are unchanged.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton	
Iron rails	$11.00 to $11.50
Rails for rolling	15.50 to 16.00
Steel rails less than 3 ft.	16.00 to 16.50
Relaying rails, 60 lb. and under	20.50 to 23.50
Relaying rails, 70 lb. and over	26.50 to 29.00
Cast iron carwheels	14.50 to 15.00
Heavy melting steel	13.00 to 13.50
Heavy shoveling steel	13.00 to 13.50
Frogs, switches and guards cut apart	14.50 to 15.00
Railroad springs	15.50 to 16.00
Heavy axle and tire turnings	10.50 to 11.00
No. 1 locomotive tires	16.25 to 16.75
Per Net Ton	
Steel angle bars	12.25 to 12.75
Steel car axles	17.25 to 17.75
Iron car axles	20.50 to 21.00
Wrought iron bars and transoms	18.00 to 18.50
No. 1 railroad wrought	10.75 to 11.25
No. 2 railroad wrought	11.75 to 12.25
Cast iron borings	9.00 to 9.50
No. 1 busheling	10.25 to 10.75
No. 1 railroad cast	14.25 to 14.75
No. 1 machinery cast	16.75 to 17.25
Railroad malleable	12.50 to 13.00
Machine shop turnings	6.25 to 6.75
Bundled sheets	8.00 to 8.50

Buffalo

Open-Hearth Output on Upgrade—Scrap Shipments Released—Pig Iron Dull

BUFFALO, Jan. 4.—Inquiry for pig iron is light and probably does not total over 1500 tons. One melter is in the market for 1000 tons of foundry iron for first quarter delivery, and this is the largest tonnage before local makers. Prices on foundry iron are apparently unchanged at $19, base Buffalo, for Eastern shipment and $20 for business in this district, though there have been reports of lower quotations.

We quote prices per gross ton, f.o.b. Buffalo, as follows:

No. 2 plain fdy., sil. 1.75 to 2.25	$19.00 to $20.00
No. 2X foundry, sil. 2.25 to 2.75	19.50 to 20.50
No. 1X foundry, sil. 2.75 to 3.25	20.50 to 21.50
Malleable, sil. up to 2.25	20.00
Basic	19.00
Lake Superior charcoal	27.26

Finished Iron and Steel.—Mills are beginning to show increased activity following the holiday period and look for improved business during this quarter. Open-hearth operations have gained, and sheet mills are running at a better rate. Sheet specifications have increased, and there are heavier shipping orders for bars and shapes, with prices holding firm. Business in bolts and nuts is fairly good, and warehouses report improvement in bookings.

Warehouse Prices f.o.b. Buffalo

	Base per Lb.
Plates and structural shapes	3.40c.
Mild steel bars	3.30c.
Cold-finished shapes	4.45c.
Rounds	3.95c.
No. 24 black sheets	4.30c.
No. 10 blue annealed sheets	3.80c.
No. 24 galvanized sheets	5.15c.
Common wire nails, base per keg	$3.90
Black wire, base per 100 lb.	3.90

of solicitation. Furnaces in all districts report New England foundries as taking iron per schedule, with possibly a half dozen unimportant exceptions.

We quote delivered prices per gross ton to most New England points as follows, having added $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia, and $6.91 to $8.77 from Alabama:

East. Penn., sil. 1.75 to 2.25	$25.65 to $26.15
East. Penn., sil. 2.25 to 2.75	26.15 to 26.65
Buffalo, sil. 1.75 to 2.25	22.91 to 23.91
Buffalo, sil. 2.25 to 2.75	23.41 to 24.41
Virginia, sil. 1.75 to 2.25	28.42 to 29.92
Virginia, sil. 2.25 to 2.75	28.92 to 30.42
Alabama, sil. 1.75 to 2.25	26.91 to 28.77
Alabama, sil. 2.25 to 2.75	27.41 to 29.27

Imports.—Imports of pig iron for December consisted of 817 tons of Dutch and 254 tons of German, a total of 1071 tons, the smallest for any month in 1926. Receipts of foreign iron at Boston by months in 1926 and 1925, in tons, follow:

	1926	1925	Decrease
January	4,061	8,212	4,151
February	10,659	13,701	3,042
March	10,810	11,365	555
April	6,332	6,167	*165
May	3,979	6,179	2,200
June	4,936	7,967	3,031
July	2,423	4,869	2,446
August	6,347	8,248	1,901
September	2,805	6,747	3,942
October	1,801	6,264	4,463
November	2,310	7,137	4,827
December	1,071	3,765	2,694
Totals	57,534	90,621	33,087

*Increase.

Coke.—New England makers of by-product foundry coke announce that January deliveries on first half contracts will be at $13.50 a ton, delivered, within a $3.10 freight rate zone, or the same as on December deliveries. Both producers report a slight improvement in the demand for foundry coke in the closing days of 1926, and a big increase in the demand for domestic fuel. Connellsville district foundry coke is still available at delivered prices $1 a ton or more under those on New England coke, with little buying.

Cast Iron Pipe.—Boston opened bids Dec. 30 on 3000 tons of 6 to 16-in. pipe. The Warren Foundry & Pipe Co. was the low American bidder. B. Nicoll & Co., acting for a European maker, submitted a bid of $3.35 a ton under that of the Warren Foundry & Pipe Co. No award has been made. Boston has awarded the Warren Foundry & Pipe Co. 200 tons of fittings, bids on which were opened Dec. 31. One of the large New England gas companies has purchased 5000 tons of pipe. Prices quoted openly on domestic pipe are: 4-in., $59.10 a ton, delivered common Boston freight rate points; 6 to 12-in., $54.10 to $55.10; larger pipe, $53.10 to $54.10. A $5 differential is asked on Class A and gas pipe.

Old Material.—Quotations on old material are virtually unchanged from a week ago. Current buying is at a minimum. Although ingot production in this country for 1926 was larger than that for 1925, it is generally estimated that shipments of scrap out of New England showed little increase. Dealers report that average prices obtained for scrap compare favorably with those for 1925 but, in view of the fact that they themselves paid more for material, net profits for 1926 were small.

The following prices are for gross-ton lots, delivered at consuming points:

Textile cast	$18.00 to $19.00
No. 1 machinery cast	18.00 to 18.50
No. 2 machinery cast	16.50 to 17.00
Stove plate	13.00 to 13.25
Railroad malleable	18.50 to 19.00

The following prices are offered per gross-ton lots, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$10.50 to $11.00
No. 1 railroad wrought	12.00 to 12.25
No. 1 yard wrought	11.00 to 11.25
Wrought pipe (1 in. in diameter, over 2 ft. long)	9.00 to 9.50
Machine shop turnings	7.50 to 8.00
Cast iron borings, chemical	10.50 to 11.00
Cast iron borings, rolling mill	8.00 to 8.50
Blast furnace borings and turnings	8.00 to 8.50
Forged scrap	8.00 to 8.50
Bundled skeleton, long	8.00 to 8.50
Forged flashings	8.00 to 8.50
Shafting	15.50 to 16.00
Street car axles	16.00 to 16.50
Rails for rerolling	12.00 to 12.50
Scrap rails	10.50 to 11.00

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Soft steel bars and small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway, rounds	6.60c.
Norway, squares and flats	7.10c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Plates	3.365c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tire steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hexagons	4.05c.
Squares and flats	4.55c.
Toe calk steel	6.00c.

San Francisco

Southern Pacific to Build 1200 Cars—Jobbers Advance Steel Pipe

SAN FRANCISCO, Dec. 31 (*By Air Mail*).—Outstanding developments of the week have been a letting of 1900 tons of fabricated steel for a fiber plant at Longview, Wash., taken by Poole & McGonigle, Portland, Ore., an advance of 2½ per cent in local jobbers' out-of-stock quotations on steel pipe and an announcement that the Southern Pacific Co., San Francisco. will build eight mountain-type locomotives, 500 box cars, 650 flat cars and 50 cabooses in its shops at Los Angeles and Sacramento, Cal. The total cost of this work will be $2,416,000. A referendum on a bond issue of $24,000,000 will be held in the near future by the San Joaquin River Water Storage District, Los Banos, Cal. About $14,000,000 of the proposed bond issue will be used for the construction of what will be known as the Friant dam and power house. The project embraces 500,000 acres in Merced, Madera, Fresno and Stanislaus Counties.

Pig Iron.—While the larger part of first quarter business has been booked, there are still several buyers who have not closed for their requirements. It is understood that contracts for the first quarter are somewhat smaller than they were one year ago. Quotations are unchanged.

	Per Gross Ton
*Utah basic	$25.00 to $26.00
*Utah foundry, sil. 2.75 to 3.25	25.00 to 26.00
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**German foundry, sil. 2.75 to 3.25	24.25

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Shapes.—Fabricated steel lettings for the week total 2455 tons. Fresh inquiry is negligible, although plans are being prepared for several good-sized jobs that are expected to come up for bids early in the new year. Eastern mills continue to quote plain material at 2.35c., c.i.f. Coast ports.

Plates.—Bids are being taken by the Board of Public Utilities Commissioners, Riverside, Cal., on 600 tons for a pipe line, and the East Bay Water Co., Oakland, Cal., will soon call for new bids on 650 tons. The Standard Oil Co. of California, San Francisco, has

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	Base per Lb.
Plates and structural shapes	3.30c.
Mild steel bars and small angles	3.30c.
Small channels and tees, ¾-in. to 2¼-in.	3.90c.
Spring steel, ¼-in. and thicker	5.00c.
No. 24 black sheets	4.90c.
No. 28 black sheets	5.15c.
No. 10 blue annealed sheets	4.00c.
No. 24 galvanized sheets	5.65c.
No. 28 galvanized sheets	6.15c.
Common wire nails, base per keg	$3.75
Cement coated nails, 100-lb. keg	3.75
Cement coated nails, count keg	3.00

placed 400 tons with two Eastern mills. Only 370 tons of steel was bought by Yakima, Wash., for its pipe line, as the larger part of it will be wood-stave and cast iron pipe. The Western Pipe & Steel Co., San Francisco, took the steel contract. Price shading in plates attracted some attention during the past week, although it has not been general. While most of the Eastern mills continue to quote 2.30c., c.i.f. Coast ports, 2.25c. is understood to have been named by more than one seller.

Bars.—Local bar jobbers have not yet announced their quotations for first quarter business. Lettings in concrete bars have been small, and locally fresh inquiries are unimportant. In San Diego, Cal., construction work on the Sutherland dam will require 525 tons to 1277 tons.

Cast Iron Pipe.—Yakima, Wash., awarded about 1000 tons of cast iron pipe for a pipe line to the American Cast Iron Pipe Co. Spokane, Wash., placed 543 tons with the United States Cast Iron Pipe & Foundry Co., and Portland, Ore., let 150 tons of special castings to the American Cast Iron Pipe Co. Two projects at Seattle, Wash., will require 713 tons; Dayton, Wash., is inquiring for 200 tons, and Astoria, Ore., will call for bids shortly on 500 tons. Quotations are unchanged at $49 to $50, base, f.o.b. dock, San Francisco.

Tin Plate.—The Red Salmon Packing Co., San Francisco, is inquiring for 6000 to 7000 base boxes.

Warehouse Business.—Local jobbers have advanced their quotations on steel pipe 2½ per cent.

Coke.—Two local importers have shipments of German by-product coke en route, which are expected to arrive here in January. Quotations are nominal and subject to conditions prevailing at the time of sale.

St. Louis

Railroad Buys Steel for 500 Automobile Cars—Pig Iron Demand Lags

ST. LOUIS, Jan. 4.—New business in pig iron has been light, and shipments have been suspended on old contracts by a number of melters who wish to hold down their inventories. This has caused a temporary weakness of the market, although generally quoted prices are unchanged. A new buying movement and substantial releases of iron for shipment during the first weeks of January are expected. The St. Louis Coke & Iron Corporation sold about 7000 tons of foundry iron during the week to Indiana and Iowa melters.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.16 freight from Chicago, $4.42 from Birmingham, all rail, and 81c. average switching charge from Granite City:

Northern fdy., sil. 1.75 to 2.25	$22.16
Northern malleable, sil. 1.75 to 2.25	22.16
Basic	22.16
Southern fdy., sil. 1.75 to 2.25	24.42
Granite City iron, sil. 1.75 to 2.25	$22.31 to 22.81

Coke.—The demand for foundry coke has fallen off considerably, but a revival of buying and heavier specifications are expected early in the year.

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and structural shapes	3.25c.
Bars, mild steel or iron	3.15c.
Cold-finished rounds, shafting and screw stock	3.75c.
No. 24 black sheets	4.45c.
No. 10 blue annealed sheets	3.60c.
No. 24 galvanized sheets	5.25c.
Black corrugated sheets	4.65c.
Galvanized corrugated sheets	5.30c.
Structural rivets	3.65c.
Boiler rivets	3.85c.
	Per Cent Off List
Tank rivets, ⅞-in. and smaller	70
Machine bolts	60 and 5
Carriage bolts	47½
Lag screws	55 and 5
Hot-pressed nuts, square, blank or tapped	3.25c. off per lb.
Hot-pressed nuts, hexagons, blank or tapped	3.75c. off per lb.

Finished Iron and Steel.—The Missouri-Kansas-Texas Railroad has purchased from a Chicago mill the steel required for 500 automobile box cars, which the road will build in its own shops. This line also is in the market for its requirements in steel castings—300 tons—for the first half of 1927. The Missouri Pacific Railroad and the Wabash Railway are in the market for their first half requirements in track bolts and spikes. The Laclede Steel Co. has received an order for 350 tons of reinforcing bars for the St. Louis High School stadium. Structural business is quiet.

Old Material.—The market continues strong, with dealers' hopes for higher prices the basis for strength. Consumers are still waiting for large prospective orders for railroad cars to materialize and are buying hardly anything. Prices are unchanged.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton	
Iron rails	$11.00 to $11.50
Rails for rolling	15.50 to 16.00
Steel rails less than 3 ft.	16.00 to 16.50
Relaying rails, 60 lb. and under	20.50 to 23.50
Relaying rails, 70 lb. and over	26.50 to 29.00
Cast iron carwheels	14.50 to 15.00
Heavy melting steel	13.00 to 13.50
Heavy shoveling steel	13.00 to 13.50
Frogs, switches and guards cut apart	14.50 to 15.00
Railroad springs	15.50 to 16.00
Heavy axle and tire turnings	10.50 to 11.00
No. 1 locomotive tires	16.25 to 16.75
Per Net Ton	
Steel angle bars	12.25 to 12.75
Steel car axles	17.25 to 17.75
Iron car axles	20.50 to 21.00
Wrought iron bars and transoms	18.00 to 18.50
No. 1 railroad wrought	10.75 to 11.25
No. 2 railroad wrought	11.75 to 12.25
Cast iron borings	9.00 to 9.50
No. 1 busheling	10.25 to 10.75
No. 1 railroad cast	14.25 to 14.75
No. 1 machinery cast	16.75 to 17.25
Railroad malleable	12.50 to 13.00
Machine shop turnings	6.25 to 6.75
Bundled sheets	8.00 to 8.50

Buffalo

Open-Hearth Output on Upgrade—Scrap Shipments Released—Pig Iron Dull

BUFFALO, Jan. 4.—Inquiry for pig iron is light and probably does not total over 1500 tons. One melter is in the market for 1000 tons of foundry iron for first quarter delivery, and this is the largest tonnage before local makers. Prices on foundry iron are apparently unchanged at $19, base Buffalo, for Eastern shipment and $20 for business in this district, though there have been reports of lower quotations.

We quote prices per gross ton, f.o.b. Buffalo, as follows:

No. 2 plain fdy., sil. 1.75 to 2.25	$19.00 to $20.00
No. 2X foundry, sil. 2.25 to 2.75	19.50 to 20.50
No. 1X foundry, sil. 2.75 to 3.25	20.50 to 21.50
Malleable, sil. up to 2.25	20.00
Basic	19.00
Lake Superior charcoal	27.28

Finished Iron and Steel.—Mills are beginning to show increased activity following the holiday period and look for improved business during this quarter. Open-hearth operations have gained, and sheet mills are running at a better rate. Sheet specifications have increased, and there are heavier shipping orders for bars and shapes, with prices holding firm. Business in bolts and nuts is fairly good, and warehouses report improvement in bookings.

Warehouse Prices f.o.b. Buffalo

	Base per Lb.
Plates and structural shapes	3.40c.
Mild steel bars	3.30c.
Cold-finished shapes	4.45c.
Rounds	3.95c.
No. 24 black sheets	4.30c.
No. 10 blue annealed sheets	3.80c.
No. 24 galvanized sheets	5.15c.
Common wire nails, base per keg	$3.90
Black wire, base per 100 lb.	3.90

Old Material.—More activity has characterized the scrap market in the past two days than for the last two months. This is because dealers are hurrying to cover on suspended shipments that were released after Jan. 1. Some of this material was No. 1 heavy melting steel sold at $17.50 and No. 2 steel sold at $15.75 to $16. Releases against shipments of No. 1 cast and stove plate have also been received. One mill has some unfilled orders out on borings and turnings that it will now accept.

We quote prices per gross ton, f.o.b. Buffalo, as follows:

Heavy melting steel	$15.00 to $15.50
Selected No. 1 heavy melting steel	16.50 to 17.00
Low phosphorus	18.00 to 19.00
No. 1 railroad wrought	14.00 to 14.50
Carwheels	16.00 to 16.50
Machine shop turnings	9.00 to 9.50
Mixed borings and turnings	12.00 to 12.50
Cast iron borings	12.00 to 12.50
No. 1 busheling	15.00 to 15.50
Stove plate	14.50 to 14.75
Grate bars	12.00 to 13.00
Hand bundled sheets	10.50 to 11.50
Hydraulic compressed sheets	15.00 to 15.50
No. 1 machinery cast	16.00 to 16.25
Railroad malleable	16.50 to 17.00
Iron axles	24.00 to 25.00
Steel axles	16.00 to 16.50
Drop forge flashings	13.00 to 13.50

Birmingham

Rail Mill Operates at Capacity—Scrap Active—Pig Iron Remains Quiet

BIRMINGHAM, Jan. 4.—Resumption of pig iron buying is expected shortly. Some small-lot purchasing has started in, but big business is still lacking. Some of the cast iron pressure pipe shops are slow in getting back into operation. Demand for the centrifugal pipe eased off materially before the holidays. Jobbing foundries are buying very little iron, but stove foundries, which are showing a revival of activity, are expected to come into the market. Quotations on foundry iron remain firm at $20, base Birmingham. Curtailment in pig iron production has held down the surplus stock of iron on furnace yards.

We quote per gross ton, f.o.b. Birmingham district furnaces, as follows:

No. 2 foundry, 1.75 to 2.25 sil.	$20.00
No. 1 foundry, 2.25 to 2.75 sil.	20.50
Basic	20.00
Charcoal, warm blast	30.00

Rolled Steel.—Open-hearth furnaces and many of the finishing mills have got back to normal production. The Ensley, Ala., rail mill is running at capacity. Demand in sight promises to support the steady operation of many mills for some time to come.

Old Material.—Large quantities of scrap are moving, and the market, at low prices, is very active. Consumers in several instances are using old material instead of pig iron. Heavy melting steel is still held at $13, with consumption large.

We quote per gross ton, f.o.b. Birmingham district yards, as follows:

Cast iron borings, chemical	$15.00 to $16.00
Heavy melting steel	13.00 to 14.00
Railroad wrought	11.00 to 12.00
Steel axles	17.00 to 18.00
Iron axles	17.00 to 18.00
Steel rails	13.00 to 14.00
No. 1 cast	16.00 to 17.00
Tramcar wheels	16.50 to 17.50
Carwheels	16.00 to 16.50
Stove plate	14.00 to 14.50
Machine shop turnings	8.00 to 8.50
Cast iron borings	8.00 to 8.50
Rails for rolling	15.00 to 16.00

Armco Culvert Association

On Jan. 1, the name of the Armco Culvert & Flume Manufacturers' Association will be changed to Armco Culvert Association. This change of name, it is explained, does not imply any change in policy. The association will continue to devote its efforts to research in matters relating to drainage and irrigation, and to educational publicity for making this research known to those whom it will benefit.

Cleveland

Large Inquiries for Pig Iron—Steel Business Shows Moderate Recovery

CLEVELAND, Jan. 4.—Mills have taken a moderate volume of business in finished steel during the past week. Consumers are now securing shipments on orders placed in December for January delivery, and a large part of the orders that are now being taken are for delivery at the convenience of the mills. Buying by the automotive industry is still light, although some good tonnage in sheets is pending from that industry.

Most of the buyers of structural material and plates have placed contracts for the first quarter at the regular prices, but not many of the large consumers of steel bars have contracted for that period. This is evidently due to the unsettled price situation in this territory, brought about by the quotations of 2c., Cleveland, and lower that are being made by a local mill. Because of this situation, bar consumers as a rule are buying only for early needs. The year starts with one pending inquiry for a Lake boat requiring 3000 tons of steel. Lake ship yards have quoted on two other boats, but inquiries for these seem to have been withdrawn.

Pig Iron.—Inquiry for foundry and malleable iron has become quite plentiful and includes several large lots. One consumer is in the market for 25,000 to 30,000 tons and another for 9000 tons, and several are asking for lots of from 1000 to 1500 tons. In addition, several inquiries aggregating 10,000 to 15,000 tons have come from southern Ohio through brokers. The establishment of a price of $18.50, Valley, on foundry iron by a round-lot sale apparently has stimulated interest among some consumers. However, others do not appear convinced that the market is definitely established at the present price, and these plan for the present to buy only for their immediate requirements. The price situation is not yet fully tested in the territory outside the Valley district but near enough to that district to be affected by Valley competition, but there has been some concession from recent Lake furnace prices to meet the situation. Some business in Cleveland was taken during the week by one producer at $19, furnace, but another is still asking $19.50 for local delivery. For outside shipment local producers quote $18.50, furnace. In Michigan, the price is unchanged at $20, furnace.

Quotations below are per gross ton and except on basic and low phosphorus iron, are delivered Cleveland, including a 50c. switching charge for local iron. Ohio silvery and Southern iron prices are based on a $3.00 freight rate from Jackson and $6.01 from Birmingham:

Basic, Valley furnace	$18.50
N'th'n No. 2 fdy., sil. 1.75 to 2.25	$19.50 to 20.00
Southern fdy., sil. 1.75 to 2.25	26.01
Malleable	19.50 to 20.00
Ohio silvery, 8 per cent	31.50
Standard low phos., Valley furn.	28.00

Cold-Rolled Strip.—Orders from the automotive industry are light, and mills have little tonnage on their books. Prices are unchanged at 3c., Cleveland, for good lots; on car lots 3.25c. is commonly quoted.

Reinforcing Bars.—Two jobs aggregating 800 tons were placed during the week, and both are understood to have been taken at a considerable concession from the commonly quoted price of 2c., as a result of the competition of a local mill that has gone to 1.90c., Cleveland, and lower for soft steel bars. Rail steel bars are quoted at 1.75c., mill, for round lots.

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and structural shapes	3.00c.
Mild steel bars	3.00c.
Cold-finished rounds and hexagons	3.90c.
Cold-finished flats and squares	4.40c.
Hoops and bands	3.65c.
No. 24 black sheets	3.80c.
No. 10 blue annealed sheets	3.25c.
No. 24 galvanized sheets	4.55c. to 4.65c.
No. 9 annealed wire, per 100 lb	$3.00
No. 9 galvanized wire, per 100 lb	3.45
Common wire nails, base, per keg	3.00

Sheets.—The market still lacks strength, although some of the mills are looking for somewhat firmer prices when an improvement in the demand, which is expected this month, materializes. Several Cleveland barrel manufacturers placed first quarter contracts during the week for approximately 4500 tons of black sheets. Most of these were purchased at 2.85c., Pittsburgh. However, some of the business went at 2.90c., Ohio mill. On blue annealed sheets some of the Ohio mills are quoting 2.30c. at mill, although others are getting the same price f.o.b. Pittsburgh, for small lots. Galvanized sheets can be bought at 3.85c., Ohio mill, for delivery through the first quarter. Some round-lot orders are pending in Detroit, and it is expected that considerable business will be placed by the automotive industry during the next few days.

Coke.—There is a limited demand for small lots of foundry coke. Connellsville brands range from $4 to $5.50 for prompt shipment.

Bolts, Nuts and Rivets.—Orders for bolts and nuts are fair, and most consumers have placed contracts for the first quarter. Prices on large rivets continue irregular, and some of the makers are showing more of a disposition to waive the extra on boiler rivets.

Old Material.—A Cleveland mill during the week purchased a moderate tonnage of heavy melting steel and blast furnace scrap. The market is firm on those grades. Dealers are paying $11.25 to $11.50 for borings and turnings, or about 25c. higher than a few weeks ago, and $14.50 to $14.75 for heavy melting steel to cover their new Cleveland orders. Not much scrap is being offered. Cold weather and snow have interfered with shipments. Generally the market has a rather firm tone at present price levels.

We quote per gross ton delivered consumers' yards in Cleveland:

Heavy melting steel No. 1	$14.50 to	$14.75
Heavy melting steel No. 2	14.00 to	14.50
Rails for rolling	16.25 to	16.50
Rails under 3 ft	16.50 to	17.00
Low phosphorus billet, bloom and slab crops	18.00 to	18.50
Low phosphorus sheet bar crops	16.50 to	17.00
Low phosphorus plate scrap	16.00 to	16.50
Low phosphorus forging crops	16.50 to	17.00
Cast iron borings	11.25 to	11.50
Machine shop turnings	9.00 to	9.25
Mixed borings and short turnings	11.25 to	11.50
Compressed sheet steel	13.50 to	14.00
No. 1 railroad wrought	11.50 to	12.00
No. 2 railroad wrought	14.00 to	14.50
Railroad malleable	16.50 to	17.00
Light bundled sheet stampings	12.00 to	12.50
Steel axle turnings	12.50 to	13.00
No. 1 cast	16.00 to	16.50
No. 1 busheling	12.00 to	12.50
No. 2 busheling	11.25 to	11.50
Drop forge flashings, 15 in. and under	11.50 to	12.00
Railroad grate bars	12.00 to	12.50
Stove plate	12.00 to	12.50
Pipes and flues	10.00 to	10.50

FABRICATED STRUCTURAL STEEL

Two Large Jobs Swell Week's Awards to 50,000 Tons—Inquiries Are Light

Including 23,000 tons for New York subways and 12,000 for a Chicago bank, structural steel awards in the week amounted to 50,000 tons. A small volume of new work came out for bids, totaling less than 18,000 tons. Awards follow:

LOWELL, MASS., 350 tons, dry goods store, to F. P. Lyons Iron Works, Manchester, N. H.

DANVERS, MASS., 100 tons, school, to New England Structural Co.

NEW YORK, 23,000 tons, sections 3 and 4, route 101, subway, to American Bridge Co.

NEW YORK, 2627 tons in the following awards as reported to the Structural Steel Board of Trade: Chapel and hall, Church of the Holy Cross, Church Avenue and Prospect Street, Brooklyn, to Lehigh Structural Steel Co.; three-story garage, 233-245 Washington Street, Brooklyn; column cores for loft building, West Fifty-second Street, to Hay Foundry & Iron Works; building for New York Telephone Co., Floral Park, L. I., apartment building, 2-4 Montague Terrace, Brooklyn, and office building, 1910 Monterey Avenue, Bronx, to Hedden Iron Construction Co.

NEW YORK, 700 tons, Cortland Street Garage, previously reported to an unnamed bidder, to Lehigh Structural Steel Co.

NEW YORK, 425 tons, public school No. 89, Paulding Avenue, to Bethlehem Fabricators, Inc.

NEW YORK, 650 tons, Corn Exchange Bank Building, 303 West Forty-second Street, to Bethlehem Fabricators, Inc.

NEW YORK, 600 tons, public school No. 123, Queens, to Bethlehem Fabricators, Inc.

BROOKLYN, 300 tons, addition to brewery, Meserole Street and Bushwick Place, to Joseph Gaydica Iron Works.

MECHANICVILLE, N. Y., 150 tons, West Virginia Pulp & Paper Co. building, to Pittsburgh Bridge & Iron Co.

CALLERY, PA., 100 tons, building for National Steel Products Co., to J. E. Moss Iron Works.

SCRANTON, PA., 365 tons, building for Wesel Mfg. Co., to Weatherly Steel Co.

SWARTHMORE, PA., 100 tons, public school building, to McClintic-Marshall Co.

WHITING, IND., 1200 tons, still supports for the Standard Oil Co., to McClintic-Marshall Co.

CHICAGO, 12,000 tons, building for the State Bank of Chicago, to American Bridge Co.

CHICAGO, 600 tons, Farwell Building, to Hansell-Elcock Co., Chicago.

NEW TRIER, MINN., 750 tons, addition to high school, to A. Bolter's Sons, Chicago.

ST. JOSEPH, MO., 150 tons, building for Insoboard Co., to St. Joseph Structural Steel Co.

PORTLAND, ORE., 140 tons, Portland Electric Power Co., to Austin Co.

LONGVIEW, WASH., 1900 tons, plant for the Longview Fibre Co., to Poole & McGonigle, Portland, Ore.

YAKIMA, WASH., 370 tons, pipe line, to Western Pipe & Steel Co., San Francisco.

OAKLAND, CAL., 105 tons, Alameda County War Memorial, Grand Avenue and Harrison Street, to Herrick Iron Works, Oakland.

SAN FRANCISCO, 450 tons, apartment building on Eddy Street, to Golden Gate Iron Works, San Francisco.

SAN FRANCISCO, 400 tons, for Standard Oil Co. of California, to two Eastern mills.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

MIDDLETOWN, CONN., 300 tons, dormitory, Wesleyan College.

BRIDGEPORT, CONN., 800 tons, highway bridge.

NEW BRITAIN, CONN., 400 tons, parochial school.

ALBANY, N. Y., 9000 tons, State office building.

LINDEN, N. J., 400 tons, factory building, Lidgerwood Mfg. Co.

HUBBARD, OHIO, 2200 tons, new plant for Valley Mold & Iron Co.

BATTLE CREEK, MICH., 1200 tons, sanitarium.

MADISON, WIS., 300 tons, post office.

MISSOULA, MONT., 150 tons, post office.

RIVERSIDE, CAL., 600 tons, pipe line, Board of Public Utilities Commissioners; bids being taken.

PORTLAND, ORE., 1000 tons, Paramount Theater.

TACOMA, WASH., 1000 tons, Paramount Theater.

RAILROAD EQUIPMENT

The Missouri Pacific Railroad has ordered 2000 freight cars. Its inquiry called for more than 3200 cars, but no disposition has been made of the remainder. This road is inquiring for 36 locomotives. The week's business in railroad equipment follows in detail:

The Missouri Pacific has ordered 2000 freight cars, of which 500 box cars and 500 automobile and furniture cars will be built by the American Car & Foundry Co., 750 40-ton automobile cars by the Mount Vernon Car & Mfg. Co. and 250 steel hopper cars by the Standard Steel Car Co. This railroad is also inquiring for 25 8-wheel switch engines, 5 Mountain type and 6 Pacific type locomotives.

The Chicago, Burlington & Quincy has placed 15 steel baggage coaches and 4 passenger-baggage coaches with the American Car & Foundry Co.

The Pennsylvania has placed 16 motor-passenger suburban coaches for Hudson & Manhattan service with an unnamed builder.

The Baltimore & Ohio is inquiring for 95 steel coaches, including 50 passenger coaches, 15 combination passenger and baggage coaches, 15 baggage coaches, 10 15-ft. mail compartment cars and 5 30-ft. mail compartment cars.

The Atlantic Tank Car Co. has purchased 100 ballast cars from the Bethlehem Steel Co.

The Baltimore & Ohio has placed five dining cars with the Pullman Car & Mfg. Corporation.

NON-FERROUS METAL MARKETS

The Week's Prices

Cents per Pound for Early Delivery

	Jan. 3	Dec. 31	Dec. 30	Dec. 29	Dec. 28
Lake copper, New York	13.50	13.50	13.50	13.62½	13.62½
Electrolytic copper, N. Y.*	13.00	13.00	13.05	13.12½	13.25
Straits tin, spot, New York	67.50	66.87½	67.25	66.62½	66.37½
Lead, New York	7.80	7.80	7.80	7.80	7.80
Lead, St. Louis	7.62½	7.65	7.65	7.65	7.65
Zinc, New York	7.32½	7.32½	7.35	7.37½	7.37½
Zinc, St. Louis	7.02½	7.02½	7.00	6.97½	6.97½

*Refinery quotation; delivered price ¼c. higher.

NEW YORK, Jan. 3.—As the new year starts the markets are all quiet. Cheerfulness pervades most of them and the expectation is for a good year. Demand for all metals the past week has naturally been very light. Price firmness rules in all markets except copper and zinc.

Copper.—The feature of the past year in prices has been a gradually declining market in the closing weeks, electrolytic selling on Dec. 31 at the lowest price for the 12 months. High production handicaps the industry as it enters the new year, but confidence is strong that good business is ahead. The past week has witnessed but little buying and demand has been satisfied at gradually declining prices. Electrolytic copper is obtainable at 13.25c., delivered in the Connecticut Valley. On Dec. 28 the quotation of Copper Exporters, Inc., was reduced from 13.95c. to 13.85c., c.i.f. Hamburg. Lake copper is quoted at 13.50c., delivered.

Copper Averages.—The average price of Lake copper for the month of December, based on daily quotations in THE IRON AGE, was 13.69c., delivered. The average price of electrolytic copper was 13.28c., refinery, or 13.53c., delivered.

Tin.—With consumers not entirely covered for January and February, and with only one-third to one-half of their requirements for March provided for, considerable activity is looked for early this year. Last week was a quiet one with the total sales estimated at about 800 tons. The largest business was done on Dec. 28 when 400 to 500 tons changed hands, with about 200 tons sold on Dec. 29. On other days the market was almost stagnant. Consumers took some metal, but dealers bought the bulk. Today, Monday, about 150 tons was sold with London dealers the principal buyers. Spot Straits tin was quoted today at 67.50c., New York. Deliveries into American consumption in December were 6505 tons with 1909 tons in stock and landing on Dec. 31. The world's visible supply increased 1069 tons during December, bringing the total on Dec. 31 to 16,326 tons as against 18,024 tons at the close of 1925.

Zinc.—The competition for the light business which is being offered has been fairly keen and prices have eased off slightly. The 7c. St. Louis level has been broken through and prime Western for early delivery has sold in some quarters at 6.97½c., which is equivalent to 7.32½c., New York.

Antimony.—The market is quiet and Chinese metal for spot delivery is quoted at 13c., New York, duty paid, for spot and future shipment.

Metals from New York Warehouse

Delivered Price per Lb.

Tin, Straits pig	69.00c. to 70.00c.
Tin, bar	71.00c. to 72.00c.
Copper, Lake	14.50c.
Copper, electrolytic	14.25c.
Copper, casting	13.75c.
Zinc, slab	7.75c. to 8.25c.
Lead, American pig	8.40c. to 8.90c.
Lead, bar	10.90c. to 11.90c.
Antimony, Asiatic	14.50c. to 15.50c.
Aluminum, No. 1 ingot for remelting (guaranteed over 99 per cent pure)	29.00c. to 30.00c.
Babbitt metal, commercial grade	30.00c. to 40.00c.
Solder, ½ and ½	43.00c. to 44.00c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base per Lb.

Sheets—	
High brass	18.62½c. to 19.62½c.
Copper, hot rolled	22.25c. to 23.25c.
Copper, cold rolled, 14 oz. and heavier	24.50c. to 25.50c.
Seamless Tubes—	
Brass	23.50c. to 24.50c.
Copper	24.25c. to 25.25c.
Brazed Brass Tubes	26.62½c. to 27.62½c.
Brass Rods	16.37½c. to 17.37½c.

From New York Warehouse

Delivered Prices, Base per Lb.

Zinc sheets (No. 9), casks	12.75c. to 13.00c.
Zinc sheets, open	13.25c. to 13.50c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Customers' Doors in City Limits)

	Base per Lb.
Sheets—	
High brass	18⅝c.
Copper, hot rolled	22.00c.
Copper, cold rolled, 14 oz. and heavier	24.25c.
Zinc	12.25c.
Lead, wide	11.25c.
Seamless Tubes—	
Brass	23.25c.
Copper	24.00c.
Brazed Brass Tubes	26⅜c.
Brass Rods	16⅛c.

Old Metals, Per Pound, New York

The buying prices represent what large dealers are paying for miscellaneous lots from the smaller accumulators, and the selling prices are those charged consumers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, heavy crucible	10.75c.	12.50c.
Copper, heavy and wire	10.50c.	11.50c.
Copper, light and bottoms	8.75c.	10.25c.
Brass, heavy	6.50c.	8.00c.
Brass, light	5.75c.	7.25c.
Heavy machine composition	8.25c.	9.75c.
No. 1 yellow brass turnings	8.00c.	8.50c.
No. 1 red brass or composition turnings	7.75c.	8.75c.
Lead, heavy	6.50c.	7.00c.
Lead, tea	4.75c.	5.50c.
Zinc	4.25c.	4.75c.
Sheet aluminum	15.00c.	17.00c.
Cast aluminum	15.00c.	17.00c.

Non-Ferrous Rolled Products

Mill prices on bronze, brass and copper products and on zinc sheets have not changed since Nov. 25 and Dec. 8 respectively. Lead full sheets were reduced ¼c. last week and are now quoted at 11.50c. to 11.75c.

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass	18.62½c.
Copper, hot rolled	22.25c.
Zinc	11.50c.
Lead (full sheets)	11.50c. to 11.75c.
Seamless Tubes—	
High brass	23.50c.
Copper	24.25c.
Rods—	
High brass	16.37½c.
Naval brass	19.12½c.
Wire—	
Copper	15.62½c.
High brass	19.12½c.
Copper in Rolls	21.12½c.
Brazed Brass Tubing	26.62½c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of the Mississippi River and also allowed to St. Louis on shipments to destinations west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide	37.50c.
Tubes, base	48.00c.
Machine rods	34.00c.

Iron and Steel Prices for Sixteen Years

Monthly Averages Computed from the Weekly Market Quotations of THE IRON AGE in the Period of 1911 to 1926

IN this issue of THE IRON AGE are our two colored price charts, in which plotted lines indicate the course of prices for pig iron, billets, scrap and leading forms of finished iron and steel and non-ferrous metals in the 14 years ended with 1926. The diagrams are based on monthly averages of prices quoted week by week in our market reports from the leading selling centers. In the tables following are the monthly average prices of more than 80 products, including those on which the charts are based.

Bessemer Pig Iron at Pittsburgh, per Gross Ton (2240 lb.)

	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
January	$15.90	$15.05	$18.15	$14.96	$14.59	$21.58	$35.95	$37.25	$33.60	$40.00	$33.96	$21.56	$29.27	$24.76	$24.64	$22.76
February	15.90	14.90	18.15	15.09	14.55	21.51	35.95	37.25	33.60	42.90	31.46	21.46	29.83	25.26	24.51	22.76
March	15.90	15.09	18.15	15.09	14.55	21.75	37.70	37.25	32.54	43.40	28.16	21.46	32.02	25.14	24.06	22.76
April	15.90	15.15	17.90	14.90	14.55	21.95	42.20	36.15	29.35	43.60	26.96	22.59	32.77	24.56	22.89	21.39
May	15.90	15.13	17.70	14.90	14.59	21.95	45.15	36.15	29.35	44.03	26.16	26.36	31.87	23.89	21.76	21.14
June	15.90	15.15	17.14	14.90	14.70	21.95	54.70	36.38	29.35	44.80	24.71	26.96	30.27	22.89	20.76	20.76
July	15.90	15.20	16.70	14.90	14.95	21.95	57.45	36.60	29.35	47.15	22.84	26.77	28.46	21.96	20.76	20.39
August	15.90	15.46	16.52	14.90	15.95	21.95	54.75	36.60	29.35	49.11	21.96	29.96	28.26	21.76	20.76	19.76
September	15.90	16.15	16.65	14.90	16.85	22.26	48.03	36.60	29.35	50.46	21.96	35.27	28.26	21.76	21.06	20.01
October	15.44	17.80	16.60	14.84	16.95	24.08	37.25	36.60	29.35	49.16	21.96	35.17	26.96	21.76	21.39	20.89
November	15.00	18.02	16.02	14.59	17.51	30.15	37.25	36.60	31.26	41.10	21.96	33.52	25.26	22.13	22.64	21.66
December	15.03	18.15	15.77	14.70	19.65	35.68	37.25	36.60	36.65	36.96	21.96	29.90	24.64	23.66	22.76	21.64
Average	*15.71*	*15.94*	*17.12*	*14.89*	*15.78*	*23.90*	*43.64*	*36.67*	*31.09*	*44.39*	*25.34*	*27.58*	*28.68*	*23.29*	*22.33*	*21.33*

Basic Pig Iron, f.o.b. Mahoning or Shenango Valley Furnace, per Gross Ton

	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
January	$13.25	$12.35	$16.41	$12.50	$12.50	$17.81	$30.00	$33.00	$30.00	$37.40	$30.00	$18.15	$25.80	$21.25	$22.00	$20.00
February	13.65	12.25	16.30	13.19	12.50	17.69	30.00	33.00	30.00	42.25	27.50	17.75	26.25	22.00	22.00	20.00
March	13.75	12.81	16.11	13.00	12.50	18.20	32.25	33.00	28.94	41.50	24.20	17.94	30.13	21.94	21.30	20.00
April	13.75	13.00	15.87	13.00	12.50	18.13	38.75	32.00	25.75	42.40	22.88	20.00	31.05	21.55	20.13	18.63
May	13.32	13.00	15.15	13.00	12.50	18.00	41.60	32.00	25.75	43.25	22.00	24.60	29.00	20.50	18.81	18.38
June	13.05	13.12	14.50	13.00	12.59	18.00	48.75	32.00	25.75	44.00	20.75	25.00	27.38	19.63	18.05	18.00
July	13.12	13.40	14.37	13.00	12.74	18.00	52.50	32.00	25.75	45.85	19.38	24.25	25.10	19.00	18.00	17.63
August	13.00	13.94	14.06	13.00	14.06	18.00	51.20	32.00	25.75	48.10	18.20	26.60	24.75	19.00	18.00	17.50
September	12.80	14.37	14.00	13.00	14.75	18.31	42.75	32.00	25.75	48.50	19.13	32.63	24.88	19.00	18.30	17.50
October	12.52	15.98	13.90	12.81	15.00	19.88	33.00	33.00	25.75	43.75	19.19	30.90	23.50	19.00	18.63	18.00
November	12.42	16.37	13.09	12.48	15.75	25.10	33.00	33.00	28.31	36.50	19.00	27.75	20.88	19.13	19.88	18.50
December	12.25	16.50	12.71	12.50	17.50	30.00	33.00	33.00	34.25	33.00	18.63	24.81	21.00	20.90	20.00	18.50
Average	*13.07*	*13.92*	*14.71*	*12.87*	*13.74*	*19.76*	*38.90*	*32.50*	*27.65*	*42.21*	*21.74*	*24.20*	*25.81*	*20.24*	*19.59*	*18.55*

Local No. 2 Foundry Pig Iron at Chicago (at Furnace), per Gross Ton

	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
January	$15.50	$14.00	$17.90	$13.75	$13.00	$18.50	$30.00	$33.00	$31.00	$40.00	$31.50	$18.90	$28.90	$23.70	$24.00	$23.00
February	15.50	14.00	17.31	14.00	13.00	18.50	32.00	33.00	31.00	42.25	29.00	19.00	29.75	24.50	24.00	23.00
March	15.50	14.00	17.25	14.25	12.95	18.70	36.00	33.00	29.94	43.00	25.60	20.00	31.25	24.38	23.80	23.00
April	15.00	14.00	17.00	14.25	13.00	19.00	39.25	33.00	26.75	43.00	24.00	20.50	32.00	24.10	22.50	22.00
May	15.00	14.50	16.00	14.06	13.00	19.00	43.80	33.00	26.75	43.00	22.80	22.60	32.00	22.75	21.13	21.63
June	15.00	14.50	15.62	13.69	13.00	19.00	51.00	33.00	26.75	43.40	20.75	23.25	31.25	21.25	20.30	21.10
July	14.87	14.70	14.70	13.75	13.00	19.00	55.00	33.00	26.75	45.25	19.00	24.25	27.90	19.60	20.50	21.00
August	14.50	15.37	15.00	13.69	13.44	18.40	55.00	33.00	26.75	46.00	19.55	28.60	27.00	20.38	20.50	21.00
September	14.50	16.00	15.00	13.25	13.90	18.13	54.67	33.00	26.75	46.00	21.75	32.00	26.75	20.50	21.00	21.00
October	14.46	17.00	15.00	12.94	14.63	19.63	33.00	34.00	27.75	44.50	21.00	31.40	25.00	20.50	21.63	21.00
November	14.09	17.75	14.87	12.56	17.13	25.80	33.00	34.00	31.00	39.40	20.60	29.75	23.13	21.00	22.75	21.00
December	14.00	18.00	14.30	13.00	18.10	29.50	33.00	34.00	38.75	34.50	19.63	28.00	23.00	22.50	23.00	21.00
Average	*14.83*	*15.32*	*15.83*	*13.60*	*14.01*	*20.26*	*41.31*	*33.25*	*29.16*	*42.53*	*22.93*	*24.85*	*28.16*	*22.10*	*22.09*	*21.64*

Standard Brands Eastern Pennsylvania No. 2X Foundry Pig Iron at Philadelphia, per Gross Ton

	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
January	$15.50	$14.85	$18.25	$14.65	$14.25	$19.94	$30.10	$34.25	$36.15	$44.10	$33.34	$21.34	$29.76	$24.11	$25.01	$24.26
February	15.50	14.85	18.25	14.94	14.25	20.00	31.88	34.25	36.15	45.10	31.09	21.09	30.01	24.04	25.01	24.14
March	15.50	14.92	17.77	15.00	14.25	20.05	37.31	34.25	34.39	45.53	27.59	21.26	32.30	24.16	24.21	23.36
April	15.50	15.00	17.40	15.00	14.25	20.50	41.38	34.25	31.90	46.85	26.26	23.62	32.95	23.06	22.82	23.26
May	15.50	15.18	16.75	14.81	14.25	20.50	43.60	34.25	30.70	47.10	25.71	26.09	32.76	22.67	21.51	22.89
June	15.25	15.31	16.19	14.75	14.25	19.94	48.19	34.29	29.50	47.15	25.50	27.06	30.76	21.85	21.26	22.66
July	15.00	15.70	15.60	14.75	14.31	19.75	53.13	34.40	29.08	48.15	23.53	27.92	27.68	21.26	21.26	22.26
August	15.00	15.87	15.60	14.75	14.94	19.55	53.00	34.40	29.60	51.96	20.64	32.26	25.89	21.51	21.57	22.26
September	15.00	16.59	15.83	14.75	16.00	19.50	51.67	34.40	30.70	53.51	21.22	34.83	26.26	21.76	21.96	22.26
October	15.00	17.60	15.95	14.63	16.25	20.31	34.25	38.85	32.10	52.53	22.23	32.54	24.04	21.76	22.64	22.26
November	14.95	18.25	15.56	14.50	17.12	24.90	34.25	39.15	35.35	44.99	22.74	30.38	23.01	22.64	23.64	23.56
December	14.85	18.25	15.20	14.25	19.05	29.25	34.25	39.15	40.10	35.54	21.82	28.86	24.26	24.56	24.26	23.39
Average	*15.21*	*16.03*	*16.53*	*14.73*	*15.26*	*21.18*	*41.03*	*35.49*	*32.98*	*46.88*	*25.14*	*27.27*	*28.31*	*22.78*	*22.93*	*23.05*

Southern No. 2 Foundry Pig Iron at Cincinnati, per Gross Ton

	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
January	$14.25	$13.25	$16.95	$13.88	$12.40	$17.90	$36.10	$35.90	$34.60	$41.80	$36.75	$20.70	$27.45	$25.55	$24.05	$25.69
February	14.25	13.31	16.69	13.81	12.40	17.90	37.53	35.90	34.60	43.60	32.63	20.00	28.68	26.55	24.05	25.69
March	14.25	13.50	16.31	14.00	12.27	17.90	31.90	35.90	33.54	43.60	29.80	19.50	30.80	26.55	24.05	25.69
April	14.25	13.75	15.65	13.75	12.34	17.90	37.40	35.90	30.65	44.00	28.00	20.38	31.05	26.35	24.05	25.69
May	13.95	14.15	14.94	13.75	12.40	17.90	41.90	35.90	29.85	45.60	26.70	22.10	30.75	25.55	24.05	25.69
June	13.44	14.25	14.06	13.63	12.50	17.34	45.15	36.08	28.39	45.60	26.38	23.00	29.30	24.05	23.25	24.59
July	13.25	14.70	13.75	13.30	12.71	16.90	49.90	36.60	28.35	45.60	24.75	22.30	28.85	22.05	22.18	24.19
August	13.45	15.06	14.06	13.25	13.71	16.70	49.90	36.60	30.40	45.78	23.50	24.35	27.68	21.55	22.55	24.19
September	13.31	15.87	14.25	13.25	14.15	17.28	49.90	36.60	31.25	46.50	23.50	29.55	26.55	21.56	22.85	24.07
October	13.25	16.80	14.35	12.90	14.78	18.03	49.38	37.60	31.60	46.50	23.50	30.85	24.68	21.55	23.43	23.69
November	13.20	17.25	13.87	12.90	16.15	22.40	35.90	37.60	34.35	42.50	22.90	27.55	23.65	21.80	24.87	23.69
December	13.19	17.25	13.95	12.50	17.10	25.90	35.90	37.60	38.60	42.50	21.75	26.93	25.05	23.85	25.49	23.69
Average	*13.67*	*14.93*	*14.90*	*13.41*	*13.58*	*18.67*	*40.07*	*36.32*	*32.16*	*44.47*	*26.68*	*23.93*	*27.87*	*23.91*	*23.75*	*24.71*

Mahoning and Shenango Valley No. 2 Foundry Iron, at Furnace, per Gross Ton

	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
January	$13.75	$13.00	$17.50	$12.85	$13.00	$18.50	$31.00	$33.00	$31.00	$39.40	$31.88	$19.30	$27.00	$22.50	$22.38	$20.50
February	13.75	13.00	17.00	13.19	13.00	18.31	32.00	33.00	31.00	41.50	28.00	18.88	27.50	23.00	22.00	20.50
March	13.75	13.12	16.69	13.25	13.00	18.50	34.75	33.00	29.94	41.25	25.90	19.00	30.50	23.00	21.10	20.50
April	13.75	13.25	15.55	13.25	12.75	18.50	39.75	33.00	26.75	42.80	24.75	20.75	31.00	21.80	20.13	19.00
May	13.75	13.25	14.62	13.00	12.94	18.20	42.40	33.00	26.75	44.25	23.50	23.80	30.20	20.75	19.13	18.88
June	13.56	13.25	14.06	13.00	12.69	18.13	50.25	33.00	26.75	45.00	22.10	24.00	27.63	19.63	18.30	17.96
July	13.50	13.37	13.87	13.00	12.70	18.25	54.50	33.00	26.75	45.00	20.13	24.25	25.50	19.00	18.50	17.69
August	13.50	13.69	14.00	13.00	13.62	18.25	53.20	33.00	26.75	47.00	19.63	32.60	24.88	19.13	18.50	17.50
September	13.44	14.44	14.00	13.00	14.70	18.39	47.00	33.00	26.75	49.40	21.00	34.88	24.75	19.80	18.80	17.63
October	13.37	16.10	13.84	12.90	14.87	20.00	33.00	34.00	26.75	46.50	21.00	31.80	23.60	19.50	19.13	18.50
November	13.20	16.94	13.50	12.75	15.50	25.00	33.00	34.00	31.50	40.25	20.75	27.88	21.88	19.50	20.39	19.00
December	13.00	17.25	13.50	12.75	18.30	30.75	33.00	34.00	36.75	36.20	20.00	25.63	22.00	21.20	20.50	18.80
Average	*13.53*	*14.22*	*14.84*	*13.00*	*13.92*	*20.07*	*40.32*	*33.25*	*28.95*	*43.21*	*23.22*	*25.23*	*26.37*	*20.73*	*19.90*	*18.87*

Gray Forge Pig Iron, Philadelphia and Vicinity, per Gross Ton

	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
January	$14.25	$14.25	$17.65	$14.00	$13.50	$18.44	$28.38	$32.00	$33.90	$40.23	$32.78	$20.60	$27.85	$22.81	$24.00	$23.00
February	14.25	14.25	17.31	14.00	13.44	19.00	29.75	32.00	33.90	40.50	30.90	20.50	28.37	22.50	23.63	23.00
March	14.60	14.25	16.87	14.00	13.25	19.00	31.94	32.00	32.84	43.00	26.86	20.50	29.62	22.12	23.40	22.30
April	14.75	14.37	16.56	14.00	13.25	19.13	38.50	32.00	29.65	43.00	25.26	21.25	30.37	22.00	22.63	22.00
May	14.70	14.50	15.81	13.81	13.25	19.50	40.40	32.00	29.21	43.00	25.26	23.80	29.50	22.00	21.50	22.00
June	14.50	14.62	15.37	13.75	13.25	19.25	44.31	32.00	26.25	43.00	24.69	24.25	28.00	22.00	21.50	21.90
July	14.50	14.87	14.95	13.75	13.25	18.50	50.05	32.00	25.92	43.00	22.50	25.50	26.90	21.20	21.50	21.50
August	14.30	15.37	14.62	13.75	14.50	18.50	49.56	32.00	26.60	45.46	21.20	29.00	25.50	21.00	21.00	21.40
September	14.45	15.87	14.56	13.75	15.13	18.50	44.25	32.00	27.00	47.10	20.00	31.00	25.50	21.00	21.00	21.00
October	14.25	16.87	15.00	13.62	15.25	19.35	32.20	36.60	28.69	47.10	20.50	31.00	24.20	21.00	21.25	21.00
November	14.25	17.62	14.75	13.50	16.05	23.75	32.00	36.60	32.40	44.64	22.50	29.14	23.00	21.37	22.00	22.50
December	14.25	17.75	14.58	13.50	17.63	27.69	32.00	36.90	36.10	38.74	21.69	28.14	23.00	23.10	23.00	22.50
Average	*14.42*	*15.38*	*15.67*	*13.79*	*14.31*	*20.05*	*37.78*	*33.18*	*30.21*	*43.23*	*24.51*	*25.39*	*26.82*	*21.84*	*22.20*	*22.01*

Malleable Pig Iron at Chicago, per Gross Ton

	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
January	$15.50	$14.35	$17.90	$13.88	$13.00	$19.00	$30.94	$33.50	$31.50	$40.50	$32.00	$18.90	$28.90	$23.88	$24.00	$23.00
February	15.50	14.14	17.31	13.94	13.00	19.00	31.75	33.50	31.50	42.75	29.38	19.13	29.75	24.50	24.00	23.00
March	15.50	14.00	17.25	14.25	13.00	19.40	35.40	33.50	30.44	43.50	25.80	20.00	31.25	24.38	24.00	23.00
April	15.25	14.00	17.05	14.25	13.00	19.50	39.00	33.50	27.25	43.50	24.00	20.50	32.00	24.10	22.63	22.00
May	15.00	14.40	16.00	14.06	13.00	19.50	43.60	33.50	27.25	43.50	23.00	22.60	32.00	22.75	21.25	21.42
June	15.00	14.50	15.62	13.88	13.00	19.50	50.25	33.50	27.25	43.50	21.50	23.25	31.25	21.25	20.60	21.10
July	15.00	14.50	14.65	14.00	13.00	19.50	55.00	33.50	27.25	45.25	19.00	24.25	27.90	19.60	20.50	21.00
August	14.80	15.10	15.00	14.00	13.44	19.00	55.00	33.50	27.25	46.50	19.60	28.60	27.00	20.38	20.50	21.00
September	14.50	16.25	15.00	13.25	14.30	19.00	54.75	33.50	27.25	46.50	21.75	32.00	26.75	20.50	21.00	21.00
October	14.50	17.10	15.20	13.00	15.25	19.88	33.50	34.50	28.25	45.75	21.00	31.40	25.00	20.50	21.63	21.00
November	14.35	17.87	14.87	12.88	17.13	25.80	33.50	34.50	31.50	39.90	20.60	29.75	23.13	20.88	22.75	21.00
December	14.35	18.00	14.63	12.90	18.20	29.50	33.50	34.50	39.50	35.00	19.63	28.00	23.00	22.62	23.00	21.00
Average	*14.94*	*15.35*	*15.87*	*13.69*	*14.11*	*20.72*	*41.35*	*33.75*	*29.68*	*43.01*	*23.11*	*24.87*	*28.16*	*22.11*	*22.15*	*21.63*

Lake Superior Charcoal Pig Iron at Chicago, per Gross Ton

	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
January	$17.87	$16.00	$18.15	$15.25	$15.75	$19.50	$31.75	$37.50	$38.85	$48.75	$42.50	$31.10	$33.15	$29.15	$29.04	$29.04
February	17.50	15.95	18.00	15.25	15.75	19.75	33.75	37.50	38.85	58.38	39.50	29.38	33.90	29.15	29.04	29.04
March	17.50	15.75	18.00	15.25	15.75	19.75	36.75	37.50	38.85	58.20	38.50	26.00	35.40	29.15	29.04	29.04
April	17.50	15.75	18.00	15.45	15.75	19.75	40.25	37.50	31.75	57.25	38.50	26.50	36.53	29.15	29.04	29.04
May	17.25	15.75	18.00	15.75	15.75	19.75	48.15	37.50	31.75	57.50	37.50	28.40	36.65	29.15	29.04	29.04
June	16.80	16.75	16.81	15.75	15.75	19.75	52.88	37.62	31.75	57.50	37.50	29.75	36.65	29.12	29.04	29.04
July	16.50	16.25	15.65	15.75	15.75	19.75	57.75	38.00	31.75	57.50	36.37	31.65	34.81	29.04	29.04	29.04
August	16.50	16.25	14.69	15.75	16.00	19.75	58.00	38.00	32.25	57.70	33.60	34.05	32.04	29.04	29.04	29.04
September	16.50	17.12	15.25	15.75	15.85	19.75	58.00	38.00	32.75	58.50	33.00	36.15	32.04	29.04	29.04	29.04
October	16.50	18.65	15.25	15.75	15.75	20.25	37.50	38.00	33.44	58.50	31.50	36.15	29.86	29.04	29.04	27.54
November	16.50	18.65	15.25	15.75	17.00	26.46	37.50	38.70	38.50	55.75	31.50	36.15	28.40	29.04	29.04	27.04
December	16.37	18.75	15.25	15.75	18.65	31.75	37.50	38.70	43.00	49.13	31.50	34.65	29.15	29.04	29.04	27.04
Average	*16.94*	*16.80*	*16.53*	*15.60*	*16.13*	*21.33*	*44.15*	*37.88*	*35.29*	*56.22*	*35.96*	*31.66*	*33.22*	*29.09*	*29.04*	*28.58*

No. 2 Foundry Pig Iron at Buffalo, (at Furnace) per Gross Ton

	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
January	$14.00	$13.50	$17.43	$12.85	$12.89	$18.75	$34.94	$33.00	$31.00	$40.90	$32.38	$19.44	$26.94	$22.25	$23.00	$21.00
February	13.69	13.50	17.06	12.94	13.00	18.53	35.25	33.00	31.00	42.00	30.50	18.87	27.56	22.25	22.75	21.00
March	14.06	13.63	16.70	13.22	12.41	18.72	38.45	33.00	29.94	44.75	29.00	18.30	29.05	21.81	22.12	21.00
April	13.75	13.56	16.22	13.50	12.80	18.88	42.62	33.00	26.75	45.00	26.15	20.81	29.56	21.37	20.65	21.00
May	13.69	13.50	15.18	13.41	12.88	18.78	44.95	33.00	26.75	45.00	25.62	22.62	29.40	20.25	19.00	20.75
June	13.39	13.88	14.32	13.13	12.87	18.65	48.31	33.00	26.75	44.75	23.42	23.05	29.06	19.37	19.00	19.60
July	13.25	14.03	13.83	13.05	12.70	18.70	52.25	33.00	26.63	45.00	20.87	24.50	26.00	19.00	18.85	19.00
August	13.50	14.50	13.98	13.25	13.85	18.63	53.00	33.00	27.77	47.75	19.50	30.70	24.95	19.19	18.72	19.00
September	13.69	15.50	14.09	13.22	14.90	19.00	53.00	33.00	28.25	50.10	20.00	33.94	24.87	19.37	18.75	19.00
October	13.10	16.62	14.00	12.72	15.63	20.37	33.00	34.00	28.70	47.44	20.37	31.12	23.06	19.05	19.40	19.00
November	13.06	17.25	13.69	12.44	16.28	27.25	33.00	34.00	34.30	42.56	19.12	27.80	20.87	20.50	21.19	19.00
December	13.25	17.56	12.87	12.95	18.13	32.75	33.00	34.00	38.25	36.60	19.30	25.50	21.56	22.62	21.50	19.00
Average	*13.54*	*14.75*	*14.95*	*13.06*	*14.03*	*20.75*	*41.81*	*33.25*	*29.67*	*44.32*	*23.85*	*24.72*	*26.07*	*20.59*	*20.41*	*19.86*

No. 2 Foundry Pig Iron at Cleveland, (Delivered Consumer) per Gross Ton

	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
January	$14.25	$13.25	$17.87	$13.50	$13.44	$19.30	$31.10	$33.30	$31.40	$40.00	$33.40	$20.06	$27.87	$23.70	$23.87	$22.32
February	14.13	13.25	17.53	13.82	13.50	19.23	32.93	33.30	31.40	41.90	30.22	20.06	29.00	24.50	23.99	22.38
March	14.13	13.25	17.16	14.25	13.47	19.05	37.06	33.30	30.58	43.15	27.80	21.55	32.15	24.50	23.47	21.81
April	14.25	13.25	16.39	14.25	13.38	19.36	40.27	33.30	27.15	43.40	26.62	20.81	32.52	24.25	22.82	20.85
May	14.25	13.30	15.62	14.38	13.38	19.45	42.90	33.30	27.15	44.53	25.50	23.75	32.21	23.25	20.87	20.00
June	14.25	13.56	14.96	14.25	13.28	19.07	50.63	33.32	27.15	44.90	24.00	24.06	30.46	21.50	20.12	19.69
July	13.94	13.81	14.69	13.75	13.20	18.79	55.80	33.40	27.15	45.20	21.31	24.75	27.44	20.25	20.00	19.50
August	13.75	14.19	14.68	13.75	14.32	18.76	55.17	33.40	27.40	48.06	20.50	31.31	26.40	20.56	20.00	19.50
September	13.75	15.45	14.75	13.75	15.27	18.92	53.15	33.40	27.65	49.86	20.75	35.94	25.87	20.81	20.00	19.50
October	13.70	16.85	14.83	13.73	15.43	20.12	33.30	34.40	28.15	47.88	20.75	34.09	25.25	21.00	20.55	19.87
November	13.25	17.59	14.40	13.51	16.61	26.20	33.30	34.40	31.90	43.46	20.56	30.47	23.35	21.31	22.32	20.60
December	13.25	17.87	13.78	13.27	18.18	31.13	33.30	34.40	36.90	36.32	19.95	27.25	23.06	22.39	22.26	20.39
Average	*13.91*	*14.64*	*15.56*	*13.85*	*14.46*	*20.78*	*41.58*	*33.60*	*29.67*	*44.06*	*24.28*	*26.18*	*27.97*	*22.34*	*21.69*	*20.52*

Southern No. 2 Foundry Pig Iron at Birmingham, Dollars per Gross Ton

	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
January	$11.00	$10.00	$13.56	$10.63	$9.50	$15.00	$23.20	$33.00	$31.00	$38.75	$32.25	$16.20	$23.25	$21.50	$20.00	$22.00
February	11.00	10.06	13.38	10.56	9.50	15.00	24.63	33.00	31.00	40.00	28.13	15.00	24.38	22.50	20.00	22.00
March	11.00	10.25	13.06	10.70	9.35	15.00	29.00	33.00	29.44	40.00	25.30	15.00	26.40	22.50	20.00	22.00
April	11.00	10.55	12.40	10.50	9.44	15.00	34.50	33.00	26.75	40.50	23.50	15.88	27.00	22.30	20.00	22.00
May	10.70	10.94	11.69	10.50	9.44	15.00	39.00	33.00	26.75	42.00	22.20	17.60	26.85	21.50	20.00	22.00
June	10.19	11.00	10.81	10.35	9.65	14.50	42.25	33.00	25.25	42.00	21.88	18.38	25.75	20.00	19.60	21.20
July	10.00	11.45	10.50	10.00	9.75	14.00	47.00	33.00	25.15	42.00	20.25	18.25	25.00	18.00	18.00	21.00
August	10.20	11.81	10.81	10.00	10.75	13.80	47.00	33.00	27.38	42.00	19.00	20.10	23.70	17.50	18.00	21.00
September	10.06	12.75	11.00	10.00	11.50	14.38	47.00	33.00	27.95	42.00	19.00	26.00	22.75	17.50	18.50	20.75
October	10.00	13.50	11.25	10.00	12.13	15.50	33.00	34.00	28.00	42.00	19.00	26.80	20.63	17.50	19.38	20.00
November	9.94	14.00	10.63	10.00	13.40	20.13	33.00	34.00	30.75	38.00	18.40	23.50	19.60	17.75	21.00	20.00
December	9.94	14.00	10.70	9.60	14.38	23.00	33.00	33.40	35.20	38.00	17.33	22.85	21.00	19.80	22.00	20.00
Average	*10.42*	*11.69*	*11.65*	*10.24*	*10.73*	*15.86*	*36.05*	*33.20*	*28.72*	*40.60*	*22.19*	*19.63*	*23.86*	*19.86*	*19.71*	*21.16*

Bessemer Pig Iron, per Gross Ton, at Valley Furnace

	1921	1922	1923	1924	1925	1926
January	$32.00	$19.60	$27.50	$23.00	$22.88	$21.00
February	29.00	19.50	28.06	23.50	22.75	21.00
March	26.20	19.50	30.25	23.38	22.30	21.00
April	25.00	20.63	31.00	22.80	21.13	19.63
May	24.20	24.40	30.10	22.13	20.00	19.38
June	22.75	25.00	28.50	21.13	19.00	19.00
July	20.88	25.00	26.70	20.20	19.00	18.63
August	20.00	28.20	26.50	20.00	19.00	18.00
September	20.00	33.50	26.50	20.00	19.30	18.25
October	20.00	33.40	25.20	20.00	19.63	19.13
November	20.00	31.75	23.25	20.38	20.88	19.90
December	20.00	28.13	22.88	21.90	21.00	19.88
Average	*23.34*	*25.63*	*27.20*	*21.53*	*20.57*	*19.57*

Basic Pig Iron, per Gross Ton, Delivered Eastern Pennsylvania

	1921	1922	1923	1924	1925	1926
January	$33.51	$20.18	$27.80	$23.00	$24.25	$23.00
February	30.65	19.84	28.19	22.69	23.88	23.00
March	26.15	22.61	29.56	21.81	23.55	22.10
April	25.00	21.00	30.81	21.50	22.31	21.75
May	25.00	24.00	30.60	21.00	21.13	21.75
June	24.63	25.00	28.14	21.00	21.50	21.45
July	22.38	25.75	26.60	20.20	21.50	21.00
August	19.70	27.23	25.00	20.00	20.50	20.95
September	19.19	30.53	25.00	20.00	20.70	20.75
October	20.50	29.30	24.20	20.00	21.25	20.69
November	20.70	27.83	22.88	21.13	22.39	22.60
December	20.63	27.31	23.13	23.41	23.00	22.00
Average	*24.00*	*25.08*	*26.83*	*21.31*	*22.16*	*21.75*

Malleable Pig Iron, per Gross Ton, f.o.b. Valley Furnace

	1921	1922	1923	1924	1925	1926
January	$32.00	$19.50	$27.00	$22.39	$22.39	$20.50
February	28.75	19.00	27.63	23.00	22.00	20.50
March	25.80	19.00	30.50	22.50	21.50	20.50
April	25.00	19.50	31.00	22.10	20.63	19.00
May	24.10	24.20	30.20	21.00	19.25	18.88
June	22.75	24.50	28.13	19.88	18.50	18.05
July	20.88	25.13	25.40	19.00	18.50	17.75
August	20.00	29.50	24.50	19.13	18.50	17.50
September	20.13	33.50	24.50	19.80	18.80	17.63
October	20.50	32.70	23.30	19.50	19.13	18.50
November	20.20	29.00	20.88	19.75	20.38	19.00
December	20.00	26.25	20.00	21.20	20.50	18.75
Average	*23.34*	*25.15*	*26.09*	*20.77*	*20.01*	*18.88*

Virginia No. 2X Foundry Pig Iron, Delivered Eastern Pennsylvania (Per Gross Ton)

	1921	1922	1923	1924	1925	1926
January	$40.49	$27.84	$32.97	$30.17	$29.67	$28.17
February	37.24	27.61	33.17	30.52	29.67	28.17
March	34.59	27.24	33.79	30.67	29.67	28.17
April	32.99	27.74	34.67	30.67	29.67	28.17
May	32.99	28.24	35.07	30.67	29.17	28.17
June	32.99	28.24	33.17	30.67	29.17	28.17
July	31.86	30.17	32.27	29.87	29.17	28.17
August	29.94	30.17	31.42	28.67	29.17	28.17
September	28.49	36.17	30.92	28.67	28.77	28.17
October	28.24	38.17	30.17	28.67	28.17	28.17
November	28.24	37.17	30.17	28.67	28.17	28.17
December	28.24	33.92	30.17	29.27	28.17	28.17
Average	*32.19*	*31.06*	*32.38*	*29.77*	*29.05*	*28.17*

Gray Forge Pig Iron, per Gross Ton, f.o.b. Valley Furnace

	1921	1922	1923	1924	1925	1926
January	$30.88	$19.00	$26.50	$22.00	$21.88	$20.00
February	27.00	18.81	27.00	22.00	21.50	20.00
March	24.70	18.75	30.00	22.00	20.60	20.00
April	23.75	20.44	30.50	21.40	19.63	18.50
May	22.40	23.30	29.70	20.25	18.63	18.38
June	20.88	23.50	26.63	19.13	17.80	17.45
July	19.13	23.75	25.00	18.50	18.00	17.20
August	18.90	29.45	24.00	18.63	18.00	17.00
September	20.00	34.13	24.00	19.30	18.30	17.13
October	20.00	31.10	23.30	19.00	18.63	18.00
November	19.70	27.63	21.39	19.00	19.88	18.50
December	19.25	25.25	21.50	20.70	20.00	18.25
Average	*22.21*	*24.59*	*25.79*	*20.16*	*19.39*	*18.39*

Standard Low-Phosphorus Pig Iron at Furnace in New York State (Per Gross Ton)

	1921	1922	1923	1924	1925	1926
January	$42.63	$30.00	$35.00	$27.10	$25.50	$23.25
February	41.50	30.00	35.00	27.00	25.50	23.00
March	41.50	30.00	35.00	27.00	25.10	22.50
April	38.75	30.00	35.00	25.80	24.75	22.38
May	38.00	30.00	33.20	24.75	24.00	22.00
June	38.00	30.00	30.50	24.75	23.00	22.00
July	38.00	30.00	29.00	24.00	22.00	22.00
August	36.80	33.00	29.00	24.00	22.00	22.00
September	36.50	38.00	28.50	24.00	22.00	22.00
October	36.50	38.00	28.00	23.75	22.00	22.88
November	36.50	38.00	27.88	23.88	24.00	24.10
December	34.87	35.00	27.50	25.30	24.00	24.00
Average	*38.25*	*32.67*	*31.13*	*25.11*	*23.65*	*22.68*

THE IRON AGE Composite Iron and Steel Prices

Composite Pig Iron Price

Average of THE IRON AGE quotations on basic pig iron at Valley furnace and foundry iron at Chicago, Birmingham, Buffalo, Valley and Philadelphia. Quoted in dollars per gross ton

	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
January	$13.63	$12.65	$16.49	$12.76	$12.38	$17.81	$28.88	$33.21	$31.36	$39.08	$31.18	$18.48	$26.78	$22.15	$22.44	$21.79
February	13.83	12.61	16.31	13.18	12.38	17.76	29.75	33.21	31.36	42.35	28.45	18.14	27.20	22.84	22.50	21.77
March	13.88	12.93	16.07	13.16	12.34	18.06	32.18	33.21	30.10	42.17	25.18	18.35	30.11	22.81	21.99	21.65
April	13.79	13.09	15.74	13.13	12.37	18.15	38.56	32.71	27.11	42.93	23.73	20.00	30.83	22.31	20.95	20.96
May	13.53	13.27	14.98	13.06	12.37	18.08	41.87	32.71	26.91	43.64	22.78	23.35	29.74	21.40	19.85	20.69
June	13.27	13.36	14.35	12.97	12.45	17.91	47.95	32.71	26.46	44.09	21.73	23.95	28.23	20.27	19.22	20.00
July	13.21	13.68	13.99	12.92	12.55	17.79	52.11	32.73	26.37	45.44	20.22	23.86	25.96	19.31	18.96	19.51
August	13.12	14.15	13.93	12.91	13.56	17.63	51.43	32.73	26.83	47.38	18.97	26.69	25.19	19.40	19.01	19.46
September	12.99	14.74	13.97	12.83	14.28	17.82	46.93	32.73	27.11	47.83	19.89	31.78	25.03	19.46	19.39	19.46
October	12.84	16.01	13.93	12.67	14.67	19.18	33.21	34.31	27.52	45.05	19.97	30.57	23.30	19.46	19.92	19.69
November	12.71	16.52	13.39	12.42	15.82	24.36	33.21	34.36	30.34	38.65	19.79	27.82	21.40	19.79	21.16	20.13
December	12.59	16.63	13.06	12.39	17.34	28.63	33.21	34.26	36.13	34.51	19.11	25.70	21.88	21.60	21.54	19.94
Average	*13.28*	*14.14*	*14.68*	*12.87*	*13.54*	*19.43*	*36.11*	*33.24*	*28.97*	*42.76*	*22.58*	*24.06*	*26.30*	*20.90*	*20.58*	*20.42*

Composite Price of Finished Steel

Average of THE IRON AGE quotations on steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets. Quoted in cents per pound

	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
January	1.615	1.424	1.771	1.451	1.383	2.06	3.384	3.549	3.371	3.158	3.057	2.059	2.469	2.783	2.560	2.447
February	1.62	1.40	1.766	1.477	1.395	2.203	3.501	3.549	3.371	3.486	2.918	2.007	2.605	2.782	2.546	2.428
March	1.623	1.394	1.786	1.473	1.413	2.447	3.739	3.549	3.282	3.743	2.764	2.014	2.721	2.746	2.537	2.433
April	1.627	1.433	1.79	1.446	1.437	2.611	4.110	3.549	3.031	3.842	2.737	2.075	2.814	2.692	2.503	2.439
May	1.62	1.456	1.727	1.424	1.433	2.75	4.562	3.549	3.021	3.804	2.764	2.113	2.793	2.639	2.460	2.416
June	1.556	1.47	1.687	1.399	1.444	2.689	5.004	3.549	3.021	3.756	2.643	2.148	2.789	2.610	2.440	2.420
July	1.546	1.504	1.667	1.40	1.471	2.64	5.334	3.549	3.021	3.885	2.455	2.169	2.783	2.563	2.435	2.421
August	1.539	1.553	1.624	1.446	1.511	2.682	5.249	3.549	3.021	3.967	2.341	2.292	2.775	2.515	2.413	2.431
September	1.513	1.61	1.591	1.47	1.559	2.765	5.049	3.549	3.004	3.956	2.248	2.419	2.775	2.487	2.397	2.439
October	1.441	1.659	1.559	1.446	1.634	2.856	3.470	3.55	3.052	3.81	2.218	2.461	2.775	2.464	2.405	2.449
November	1.407	1.70	1.505	1.397	1.769	3.021	3.444	3.549	3.084	3.566	2.129	2.445	2.775	2.481	2.423	2.452
December	1.399	1.725	1.463	1.366	1.941	3.278	3.441	3.461	3.11	3.114	2.107	2.439	2.775	2.540	2.450	2.453
Average	*1.542*	*1.529*	*1.663*	*1.434*	*1.534*	*2.671*	*4.188*	*3.548*	*3.116*	*3.675*	*2.532*	*2.220*	*2.738*	*2.609*	*2.465*	*2.439*

Billets and Finished Steel

Bessemer Steel Billets at Pittsburgh, per Gross Ton

	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
January	$23.00	$20.00	$28.30	$29.13	$19.25	$32.00	$63.00	$47.50	$43.50	$48.00	$43.50	$28.00	$37.30	$40.00	$37.00	$35.00
February	23.00	20.00	28.50	21.00	19.50	33.50	65.00	47.50	43.50	55.25	42.25	28.00	39.63	40.00	37.00	35.00
March	23.00	19.75	28.50	21.00	19.70	42.40	66.25	47.50	42.25	60.00	38.40	28.00	44.38	40.00	36.70	35.00
April	23.00	20.00	28.50	20.80	20.00	45.00	73.75	47.50	38.50	60.00	37.50	29.50	45.00	40.00	35.50	35.00
May	22.60	20.80	27.37	20.00	20.00	45.00	86.00	47.50	38.50	60.00	37.00	34.00	44.60	38.50	35.25	35.00
June	21.00	20.87	26.50	19.50	20.50	43.50	98.75	47.50	38.50	61.00	37.00	35.00	42.63	38.00	35.00	35.00
July	21.00	21.50	26.60	19.00	21.38	41.00	100.00	47.50	38.50	62.50	32.25	35.00	42.50	38.00	35.00	35.00
August	21.00	22.12	26.00	20.25	23.13	44.20	86.00	47.50	38.50	61.00	29.60	36.10	42.50	37.75	35.00	35.00
September	20.75	23.62	24.87	21.00	24.10	45.00	66.25	47.50	38.50	58.74	29.00	39.50	41.88	36.40	35.00	35.00
October	20.00	26.00	23.30	20.00	24.63	46.25	49.38	47.50	38.50	55.00	29.00	40.00	40.00	35.75	34.25	35.00
November	19.50	27.00	21.00	19.25	26.50	52.00	47.50	47.50	41.38	49.70	29.00	37.75	40.00	35.50	34.75	35.00
December	19.25	27.00	20.00	19.00	30.60	57.50	47.50	45.50	46.00	43.50	29.00	36.50	40.00	36.00	35.00	35.00
Average	*21.43*	*22.39*	*25.79*	*20.08*	*22.44*	*43.95*	*70.78*	*47.33*	*40.51*	*56.22*	*34.46*	*33.95*	*41.70*	*37.99*	*35.23*	*35.00*

Open-Hearth Steel Billets at Pittsburgh, per Gross Ton

	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
January	$23.00	$20.00	$28.90	$20.25	$19.25	$33.00	$63.00	$47.50	$43.50	$48.00	$43.50	$28.00	$37.50	$40.00	$38.00	$35.00
February	23.00	20.00	29.00	21.00	19.50	34.75	65.00	47.50	43.50	55.25	41.00	28.00	39.63	40.00	38.00	35.00
March	23.00	19.39	29.00	21.00	19.70	42.60	66.25	47.50	42.25	60.00	38.50	28.00	44.39	40.00	36.70	35.00
April	23.00	20.00	29.00	20.80	20.00	45.00	73.75	47.50	38.50	60.00	37.50	29.50	45.00	40.00	35.50	35.00
May	22.60	20.25	27.63	20.00	20.00	43.40	86.00	47.50	38.50	60.00	37.00	34.00	45.00	38.50	35.25	35.00
June	21.00	20.75	26.50	19.40	20.50	41.50	98.75	47.50	38.50	61.00	37.00	35.00	42.63	38.00	35.00	35.00
July	21.00	21.63	26.60	19.00	21.88	42.75	100.00	47.50	38.50	65.00	32.25	35.00	42.50	38.00	35.00	35.00
August	21.00	22.63	25.39	20.25	23.50	45.00	82.50	47.50	38.50	61.00	29.60	35.50	42.50	37.75	35.00	35.00
September	20.50	24.13	24.13	21.00	24.60	45.00	66.25	47.50	38.50	58.75	29.00	39.50	41.88	36.40	35.00	35.00
October	19.00	26.70	23.30	20.00	25.25	46.25	50.50	47.50	38.50	55.00	29.00	40.00	40.00	35.75	34.25	35.00
November	19.00	27.50	21.00	19.25	27.25	52.00	47.50	47.50	41.39	49.70	29.00	37.75	40.00	35.50	34.75	35.00
December	19.25	27.75	20.00	19.00	31.80	57.50	47.50	45.50	46.40	43.50	29.00	36.50	40.00	36.00	35.00	35.00
Average	*21.28*	*22.56*	*25.87*	*20.08*	*22.77*	*44.06*	*70.58*	*47.33*	*40.54*	*56.43*	*34.36*	*33.90*	*41.75*	*37.99*	*35.62*	*35.00*

Wire Rods at Pittsburgh

No. 5 Bessemer wire rods, per gross ton. The quotations for November and December, 1917, and all of 1918, are Government prices and apply also to open-hearth rods

	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
January	$28.00	$24.37	$30.00	$25.50	$25.00	$43.00	$75.00	$57.00	$57.00	$60.00	$57.00	$36.00	$47.00	$51.00	$48.00	$45.00
February	28.75	25.00	30.00	26.38	25.00	48.00	77.50	57.00	57.00	63.75	54.50	35.75	49.38	51.00	48.00	45.00
March	29.00	25.00	30.00	26.50	25.00	54.80	81.00	57.00	55.75	70.00	52.00	36.00	50.00	51.00	48.00	45.00
April	29.00	25.00	30.00	26.00	25.00	60.00	86.00	57.00	52.00	70.00	49.00	38.00	50.25	51.00	47.00	45.00
May	29.00	25.00	30.00	25.50	25.00	60.00	86.00	57.00	52.00	72.50	48.00	38.00	51.00	48.75	46.00	45.00
June	28.25	25.00	29.50	24.50	25.00	53.75	92.50	57.00	52.00	75.00	48.00	38.50	51.00	48.00	45.60	45.00
July	27.00	25.00	28.30	24.50	25.63	53.75	96.25	57.00	52.00	75.00	43.00	40.00	51.00	48.00	45.00	45.00
August	27.00	25.80	28.00	25.00	27.00	55.00	94.00	57.00	52.00	75.00	41.80	42.40	51.00	46.50	45.00	45.00
September	27.00	27.00	27.37	26.20	29.40	55.00	88.75	57.00	52.00	75.00	39.50	46.25	51.00	46.00	45.00	45.00
October	26.00	28.50	26.60	25.88	31.75	55.00	77.25	57.00	52.00	75.00	40.50	45.00	51.00	45.50	45.00	45.00
November	25.30	29.75	25.87	25.25	36.25	63.00	57.00	57.00	54.50	66.40	40.00	45.00	51.00	45.00	45.00	45.00
December	24.50	30.00	25.17	25.00	39.50	68.75	57.00	57.00	59.50	57.00	38.00	45.00	51.00	48.00	45.00	45.00
Average	*27.40*	*26.29*	*28.40*	*25.52*	*28.29*	*55.84*	*79.77*	*57.00*	*53.98*	*69.55*	*45.94*	*40.49*	*50.39*	*48.31*	*46.05*	*45.00*

Plain Wire, Base, at Pittsburgh, Cents per Pound

	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
January	1.51	1.37	1.55	1.35	1.34	1.98	2.95	3.25	3.25	3.25	3.25	2.25	2.45	2.75	2.60	2.50
February	1.55	1.40	1.55	1.40	1.39	2.10	2.95	3.25	3.25	3.50	3.13	2.20	2.63	2.75	2.60	2.50
March	1.57	1.40	1.56	1.40	1.40	2.25	3.11	3.25	3.19	3.50	3.00	2.25	2.65	2.75	2.60	2.50
April	1.60	1.40	1.60	1.40	1.37	2.25	3.23	3.25	3.00	3.50	3.00	2.25	2.68	2.75	2.50	2.50
May	1.60	1.40	1.60	1.36	1.35	2.45	3.45	3.25	3.00	3.50	3.00	2.25	2.75	2.68	2.50	2.50
June	1.55	1.40	1.60	1.30	1.35	2.45	3.70	3.25	3.00	3.50	2.75	2.25	2.75	2.65	2.49	2.50
July	1.50	1.42	1.58	1.32	1.39	2.45	3.95	3.25	3.00	3.50	2.56	2.25	2.75	2.63	2.50	2.50
August	1.50	1.46	1.48	1.36	1.43	2.53	3.95	3.25	3.00	3.69	2.50	2.29	2.75	2.56	2.50	2.50
September	1.46	1.50	1.47	1.40	1.54	2.55	3.95	3.25	3.00	3.75	2.58	2.39	2.75	2.53	2.50	2.50
October	1.44	1.50	1.41	1.40	1.65	2.60	3.25	3.25	3.17	3.75	2.60	2.45	2.75	2.50	2.50	2.50
November	1.37	1.50	1.39	1.39	1.72	2.80	3.25	3.25	3.29	3.65	2.56	2.45	2.75	2.50	2.50	2.50
December	1.34	1.53	1.35	1.31	1.89	2.95	3.25	3.25	3.21	3.25	2.44	2.45	2.75	2.60	2.50	2.50
Average	*1.50*	*1.44*	*1.51*	*1.37*	*1.48*	*2.47*	*3.43*	*3.25*	*3.11*	*3.53*	*2.78*	*2.31*	*2.70*	*2.64*	*2.52*	*2.50*

Wire Nails at Pittsburgh, Dollars per Keg of 100 Lb.

	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
January	$2.00	$2.05	$1.95	$1.85	$1.71	$1.57	$1.75	$1.54	$1.54	$2.13	$3.00	$3.50	$3.50	$4.50	$3.25	$2.50	$2.70	$3.00	$2.85	$2.65
February	2.00	2.05	1.95	1.85	1.75	1.60	1.75	1.60	1.57	2.25	3.00	3.50	3.50	4.50	3.21	2.40	2.78	3.00	2.85	2.65
March	2.00	2.05	1.95	1.85	1.79	1.60	1.76	1.60	1.60	2.40	3.20	3.50	3.44	4.00	3.02	2.40	2.83	3.00	2.85	2.65
April	2.00	2.05	1.87	1.85	1.80	1.60	1.80	1.60	1.56	2.40	3.28	3.50	3.25	4.00	3.13	2.40	2.93	3.00	2.80	2.65
May	2.00	2.05	1.65	1.82	1.80	1.60	1.80	1.56	1.55	2.50	3.50	3.50	3.25	4.00	3.05	2.40	3.00	2.93	2.75	2.65
June	2.00	1.97	1.70	1.80	1.75	1.60	1.80	1.50	1.55	2.50	3.75	3.50	3.25	4.00	3.00	2.40	3.00	2.90	2.68	2.65
July	2.00	1.95	1.72	1.75	1.70	1.62	1.70	1.52	1.60	2.50	4.00	3.50	3.25	4.00	2.81	2.40	3.00	2.88	2.65	2.65
August	2.00	1.95	1.80	1.70	1.69	1.66	1.65	1.56	1.61	2.58	4.00	3.50	3.25	4.25	2.75	2.48	3.00	2.81	2.65	2.65
September	2.05	1.95	1.80	1.70	1.65	1.70	1.65	1.60	1.69	2.60	4.00	3.50	3.25	4.25	2.86	2.63	3.00	2.78	2.65	2.65
October	2.05	1.95	1.80	1.70	1.64	1.70	1.63	1.60	1.80	2.63	...	3.50	3.31	4.25	2.90	2.70	3.00	2.75	2.63	2.65
November	2.05	1.95	1.80	1.70	1.55	1.70	1.59	1.50	1.87	2.85	3.50	3.50	3.50	4.05	2.84	2.70	3.00	2.75	2.65	2.65
December	2.05	1.95	1.85	1.70	1.53	1.72	1.55	1.51	2.04	3.00	3.50	3.50	4.12	3.25	2.69	2.70	3.00	2.85	2.65	2.65
Average	*2.02*	*1.99*	*1.82*	*1.77*	*1.70*	*1.64*	*1.70*	*1.56*	*1.67*	*2.53*	*3.52*	*3.50*	*3.41*	*4.09*	*2.96*	*2.51*	*2.94*	*2.89*	*2.72*	*2.65*

Steel Rails at Mill, Dollars per Gross Ton

Bessemer rails to end of 1913; open-hearth rails from beginning of 1914

The extra $2 per gross ton, which was for many years charged for open-hearth rails, was annulled with the rail price announced Oct. 22, 1921

	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
January	$28.00	$28.00	$28.00	$30.00	$30.00	$30.00	$40.00	$57.00	$57.00	$47.00	$47.00	$40.00	$43.00	$43.00	$43.00	$43.00
February	28.00	28.00	28.00	30.00	30.00	30.00	40.00	57.00	57.00	47.00	47.00	40.00	43.00	43.00	43.00	43.00
March	28.00	28.00	28.00	30.00	30.00	30.00	40.00	57.00	54.50	49.50	47.00	40.00	43.00	43.00	43.00	43.00
April	28.00	28.00	28.00	30.00	30.00	30.00	40.00	57.00	47.00	57.00	47.00	40.00	43.00	43.00	43.00	43.00
May	28.00	28.00	28.00	30.00	30.00	35.00	40.00	57.00	47.00	57.00	47.00	40.00	43.00	43.00	43.00	43.00
June	28.00	28.00	28.00	30.00	30.00	35.00	40.00	57.00	47.00	57.00	47.00	40.00	43.00	43.00	43.00	43.00
July	28.00	28.00	28.00	30.00	30.00	35.00	40.00	57.00	47.00	57.00	47.00	40.00	43.00	43.00	43.00	43.00
August	28.00	28.00	28.00	30.00	30.00	35.00	40.00	57.00	47.00	57.00	47.00	40.00	43.00	43.00	43.00	43.00
September	28.00	28.00	28.00	30.00	30.00	35.00	40.00	57.00	47.00	57.00	47.00	40.00	43.00	43.00	43.00	43.00
October	28.00	28.00	28.00	30.00	30.00	35.00	....	57.00	47.00	57.00	45.25	43.00	43.00	43.00	43.00	43.00
November	28.00	28.00	28.00	30.00	30.00	38.00	....	57.00	47.00	57.00	40.00	43.00	43.00	43.00	43.00	43.00
December	28.00	28.00	28.00	30.00	30.00	40.00	....	57.00	47.00	53.00	40.00	43.00	43.00	43.00	43.00	43.00
Average	*28.00*	*28.00*	*28.00*	*30.00*	*30.00*	*34.00*	*40.00*	*57.00*	*49.29*	*54.38*	*45.69*	*40.75*	*43.00*	*43.00*	*43.00*	*43.00*

Soft Steel Bars at Pittsburgh, Cents per Pound

	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
January	1.60	1.60	1.40	1.50	1.40	1.15	1.70	1.20	1.10	2.03	3.15	2.90	2.70	2.75	2.35	1.50	2.04	2.40	2.10	2.00
February	1.60	1.60	1.35	1.50	1.40	1.12	1.70	1.20	1.10	2.31	3.25	2.90	2.70	3.00	2.15	1.39	2.20	2.40	2.10	2.00
March	1.60	1.60	1.20	1.45	1.40	1.10	1.85	1.20	1.15	2.65	3.63	2.90	2.61	3.63	2.00	1.39	2.39	2.40	2.10	2.00
April	1.60	1.60	1.15	1.45	1.40	1.16	1.84	1.15	1.20	2.88	3.75	2.90	2.35	3.75	2.05	1.50	2.50	2.29	2.05	2.00
May	1.60	1.60	1.19	1.45	1.37	1.20	1.70	1.14	1.20	3.00	4.00	2.90	2.35	3.63	2.10	1.58	2.40	2.24	2.00	1.95
June	1.60	1.45	1.20	1.45	1.25	1.20	1.60	1.11	1.21	2.75	4.25	2.90	2.35	3.50	2.05	1.70	2.40	2.20	2.00	2.00
July	1.60	1.40	1.27	1.45	1.23	1.25	1.50	1.12	1.25	2.63	4.50	2.90	2.35	3.50	1.84	1.70	2.40	2.15	2.00	2.00
August	1.60	1.40	1.32	1.40	1.20	1.30	1.40	1.19	1.30	2.56	4.30	2.90	2.35	3.25	1.74	1.88	2.40	2.13	1.95	2.00
September	1.60	1.40	1.39	1.40	1.19	1.37	1.40	1.20	1.34	2.60	4.00	2.90	2.35	3.25	1.63	2.00	2.40	2.04	1.92	2.00
October	1.60	1.40	1.51	1.40	1.12	1.45	1.39	1.15	1.44	2.75	2.90	2.90	2.39	3.13	1.55	2.00	2.40	2.00	2.00	2.00
November	1.60	1.40	1.50	1.40	1.08	1.55	1.29	1.10	1.62	2.83	2.90	2.90	2.69	2.87	1.50	2.00	2.40	2.03	2.00	2.00
December	1.60	1.40	1.50	1.40	1.12	1.66	1.21	1.07	1.84	3.00	2.90	2.80	2.75	2.35	1.50	2.00	2.40	2.10	2.00	2.00
Average	*1.60*	*1.49*	*1.33*	*1.44*	*1.26*	*1.29*	*1.55*	*1.15*	*1.31*	*2.67*	*3.63*	*2.89*	*2.50*	*3.22*	*1.87*	*1.72*	*2.36*	*2.20*	*2.02*	*2.00*

Tank Plates at Pittsburgh, Cents per Pound

	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
January	1.70	1.70	1.60	1.55	1.40	1.15	1.75	1.20	1.10	2.25	4.45	3.25	3.00	2.72	2.65	1.48	2.66	2.50	2.00	1.86
February	1.70	1.70	1.52	1.55	1.40	1.11	1.71	1.20	1.10	2.56	4.88	3.25	3.00	3.50	2.33	1.39	2.23	2.45	2.00	1.80
March	1.70	1.70	1.30	1.55	1.40	1.12	1.70	1.18	1.10	3.10	5.25	3.25	2.91	3.63	2.04	1.39	2.39	2.39	2.00	1.86
April	1.70	1.70	1.27	1.55	1.40	1.21	1.68	1.15	1.15	3.56	5.88	3.25	2.65	3.75	2.10	1.48	2.50	2.28	2.00	1.90
May	1.70	1.70	1.29	1.51	1.39	1.25	1.60	1.12	1.15	3.75	6.60	3.25	2.65	3.75	2.20	1.56	2.50	2.20	2.00	1.86
June	1.70	1.62	1.25	1.48	1.35	1.25	1.45	1.10	1.16	3.63	8.00	3.25	2.65	3.55	1.95	1.63	2.50	2.18	1.92	1.88
July	1.70	1.60	1.33	1.41	1.35	1.30	1.45	1.10	1.22	3.44	9.00	3.25	2.65	3.38	1.85	1.70	2.50	2.09	1.90	1.90
August	1.70	1.60	1.40	1.40	1.34	1.35	1.44	1.18	1.26	3.70	8.80	3.25	2.65	3.25	1.78	1.88	2.50	1.95	1.85	1.90
September	1.70	1.60	1.46	1.40	1.29	1.47	1.40	1.20	1.34	4.00	8.00	3.25	2.53	3.25	1.64	2.13	2.50	1.82	1.80	1.90
October	1.70	1.60	1.50	1.40	1.17	1.53	1.36	1.14	1.44	4.00	3.25	3.25	2.61	3.09	1.60	2.11	2.50	1.80	1.80	1.90
November	1.70	1.60	1.54	1.40	1.13	1.59	1.26	1.08	1.65	4.15	3.25	3.25	2.65	2.81	1.54	1.99	2.50	1.83	1.86	1.90
December	1.70	1.60	1.55	1.40	1.15	1.60	1.20	1.05	2.04	4.25	3.25	3.13	2.65	2.65	1.50	1.95	2.50	1.92	1.90	1.90
Average	*1.70*	*1.64*	*1.42*	*1.47*	*1.31*	*1.33*	*1.50*	*1.14*	*1.31*	*3.53*	*5.88*	*3.24*	*2.72*	*3.28*	*1.93*	*1.72*	*2.43*	*2.12*	*1.91*	*1.88*

Structural Shapes at Pittsburgh, Cents per Pound

	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
January	1.70	1.70	1.60	1.55	1.40	1.15	1.75	1.20	1.10	1.90	3.25	3.00	2.80	2.47	2.45	1.50	2.06	2.50	2.10	1.90
February	1.70	1.70	1.52	1.51	1.40	1.11	1.71	1.20	1.10	2.06	3.25	3.00	2.80	2.70	2.26	1.39	2.20	2.50	2.10	1.90
March	1.70	1.70	1.30	1.50	1.40	1.15	1.70	1.19	1.10	2.40	3.54	3.00	2.71	3.13	2.08	1.39	2.39	2.39	2.10	1.90
April	1.70	1.70	1.27	1.50	1.40	1.21	1.68	1.15	1.20	2.55	3.88	3.00	2.45	3.25	2.10	1.50	2.50	2.29	2.05	1.90
May	1.70	1.70	1.27	1.50	1.39	1.25	1.50	1.14	1.20	2.60	4.00	3.00	2.45	3.10	2.20	1.56	2.50	2.24	2.00	1.90
June	1.70	1.62	1.25	1.48	1.35	1.25	1.45	1.11	1.20	2.53	4.31	3.00	2.45	3.10	2.10	1.63	2.50	2.20	2.00	1.94
July	1.70	1.60	1.33	1.41	1.35	1.30	1.45	1.12	1.25	2.50	4.50	3.00	2.45	3.10	1.93	1.70	2.50	2.09	2.00	2.00
August	1.70	1.60	1.40	1.40	1.35	1.35	1.45	1.19	1.30	2.52	4.30	3.00	2.45	3.10	1.82	1.88	2.50	2.00	1.95	2.00
September	1.70	1.60	1.46	1.40	1.34	1.42	1.41	1.20	1.35	2.64	4.00	3.00	2.45	3.10	1.64	2.00	2.50	2.00	1.90	2.00
October	1.70	1.60	1.50	1.40	1.21	1.48	1.37	1.15	1.44	2.75	3.00	3.00	2.45	3.05	1.60	2.00	2.50	1.93	1.90	2.00
November	1.70	1.60	1.54	1.40	1.13	1.57	1.29	1.10	1.60	2.86	3.00	3.00	2.45	2.89	1.54	2.00	2.50	2.00	1.90	2.00
December	1.70	1.60	1.55	1.40	1.15	1.60	1.25	1.07	1.78	3.25	3.00	2.90	2.45	2.45	1.50	2.00	2.50	2.10	1.90	2.00
Average	*1.70*	*1.64*	*1.42*	*1.45*	*1.32*	*1.32*	*1.50*	*1.15*	*1.31*	*2.55*	*3.67*	*2.99*	*2.53*	*2.95*	*1.94*	*1.71*	*2.43*	*2.19*	*1.99*	*1.95*

No. 28 Black Sheets, at Pittsburgh, Cents per Pound

	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
January	2.60	2.52	2.50	2.40	2.20	1.90	2.31	1.87	1.80	2.60	4.50	5.00	4.70	4.48	4.35	3.00	3.35	3.83	3.60	3.35
February	2.60	2.50	2.50	2.40	2.20	1.87	2.35	1.95	1.80	2.60	4.69	5.00	4.70	5.00	4.21	3.00	3.46	3.85	3.50	3.28
March	2.60	2.50	2.25	2.40	2.20	1.80	2.35	1.95	1.80	2.71	4.94	5.00	4.61	5.50	3.88	3.00	3.71	3.78	3.44	3.25
April	2.60	2.50	2.20	2.40	2.20	1.86	2.35	1.91	1.80	2.85	5.75	5.00	4.35	5.50	3.88	3.11	4.00	3.71	3.35	3.25
May	2.60	2.50	2.20	2.40	2.20	1.90	2.30	1.85	1.79	2.89	7.00	5.00	4.35	5.50	4.00	3.15	3.88	3.60	3.20	3.18
June	2.60	2.50	2.20	2.40	2.00	1.90	2.27	1.81	1.75	2.90	7.88	5.00	4.35	5.50	3.80	3.15	3.85	3.53	3.15	3.10
July	2.60	2.50	2.20	2.24	2.00	1.95	2.25	1.80	1.75	2.90	8.50	5.00	4.35	6.75	3.31	3.15	3.81	3.46	3.13	3.10
August	2.60	2.50	2.20	2.21	1.99	2.02	2.21	1.86	1.85	2.90	8.50	5.00	4.35	7.50	2.90	3.23	3.75	3.45	3.15	3.10
September	2.60	2.50	2.26	2.15	1.91	2.07	2.14	1.95	1.90	2.93	8.50	5.00	4.35	7.38	2.81	3.35	3.75	3.50	3.14	3.15
October	2.60	2.50	2.30	2.20	1.85	2.21	2.04	1.94	2.03	3.23	...	5.05	4.35	6.69	3.00	3.47	3.75	3.50	3.11	3.23
November	2.60	2.50	2.30	2.20	1.85	2.25	1.97	1.87	2.25	3.65	5.00	5.00	4.35	5.77	2.86	3.35	3.75	3.50	3.25	3.25
December	2.60	2.50	2.40	2.19	1.84	2.25	1.89	1.82	2.50	4.31	5.00	4.85	4.35	4.35	3.00	3.35	3.75	3.54	3.33	3.25
Average	*2.60*	*2.50*	*2.29*	*2.30*	*2.04*	*2.03*	*2.20*	*1.88*	*1.92*	*3.04*	*6.39*	*4.99*	*4.43*	*5.83*	*3.50*	*3.19*	*3.73*	*3.60*	*3.28*	*3.21*

Automobile Body Sheets, Base No. 22 Gage, f.o.b. Pittsburgh, Cents per Pound

	1920	1921	1922	1923	1924	1925	1926
January	5.45	5.20	4.35	4.70	5.35	4.75	4.50
February	5.60	5.20	4.35	4.78	5.35	4.68	4.43
March	5.80	5.20	4.35	5.00	5.35	4.46	4.40
April	6.15	5.20	4.40	5.00	5.25	4.40	4.33
May	6.25	5.20	4.45	5.35	5.10	4.40	4.29
June	6.20	4.95	4.50	5.35	5.10	4.22	4.20
July	6.80	4.70	4.60	5.35	5.06	4.15	4.20
August	6.95	4.65	4.75	5.35	4.75	4.25	4.20
September	7.00	4.45	4.85	5.35	4.72	4.25	4.25
October	7.00	4.55	4.85	5.35	4.60	4.29	4.25
November	6.60	4.35	4.85	5.35	4.60	4.40	4.25
December	5.25	4.35	4.70	5.35	4.75	4.50	4.25
Average	*6.25*	*4.83*	*4.58*	*5.19*	*5.00*	*4.39*	*4.30*

Blue Annealed Sheets, Base Nos. 9 and 10 Gage, Cents per Pound, at Pittsburgh

	1920	1921	1922	1923	1924	1925	1926
January	3.65	3.55	2.25	2.52	3.00	2.70	2.50
February	4.25	3.29	2.25	2.64	3.00	2.70	2.50
March	4.50	3.04	2.25	2.95	2.93	2.69	2.50
April	4.50	3.05	2.36	3.25	2.86	2.53	2.43
May	4.50	3.10	2.40	3.20	2.80	2.40	2.40
June	4.50	2.88	2.40	3.00	2.76	2.31	2.32
July	5.38	2.55	2.40	3.00	2.68	2.30	2.30
August	6.00	2.31	2.44	3.00	2.63	2.30	2.30
September	5.56	2.23	2.50	3.00	2.69	2.25	2.30
October	4.98	2.25	2.60	3.00	2.70	2.26	2.30
November	4.54	2.25	2.55	3.00	2.70	2.40	2.30
December	3.55	2.25	2.50	3.00	2.70	2.50	2.30
Average	*4.66*	*2.73*	*2.41*	*2.96*	*2.79*	*2.45*	*2.37*

Hot-Rolled and Cold-Rolled Strip Steel

Quoted in Cents per Pound, at Pittsburgh

	COLD-ROLLED STRIP STEEL							HOT-ROLLED STRIP STEEL							
	1919	1920	1921	1922	1923	1924	1925	1926	1919	1920	1921	1922	1923	1924	1925	1926
January	6.25	6.00	6.25	3.50	4.50	5.00	4.00	3.90	3.30	3.45	3.30	2.00	2.75	3.00	2.25	2.30
February	6.25	7.00	6.06	3.50	4.69	4.75	4.00	3.90	3.30	4.63	3.11	1.84	2.86	3.00	2.35	2.30
March	6.10	7.00	5.83	3.50	5.00	4.75	4.00	3.90	3.30	5.00	2.93	1.81	3.18	2.93	2.40	2.30
April	5.65	7.75	5.54	3.61	5.25	4.75	4.00	3.79	3.30	5.25	2.76	1.93	3.20	2.75	2.40	2.30
May	5.65	8.50	4.98	3.71	5.25	4.50	3.94	3.75	3.30	5.50	2.53	2.20	3.30	2.75	2.20	2.30
June	5.65	8.50	4.88	4.00	5.19	4.50	3.53	3.72	3.05	5.50	2.50	2.40	3.23	2.50	2.20	2.30
July	5.65	8.50	4.25	4.00	5.00	4.30	3.63	3.60	3.05	5.50	2.46	2.50	3.00	2.50	2.20	2.30
August	5.65	8.50	3.96	4.10	5.00	4.13	3.75	3.60	3.31	5.50	2.23	2.60	3.00	2.25	2.20	2.30
September	5.65	8.50	3.78	4.25	5.00	4.00	3.75	3.50	3.30	5.50	2.00	2.75	3.00	2.25	2.20	2.30
October	5.65	8.25	3.75	4.50	5.00	4.00	3.75	3.25	3.30	5.25	2.00	2.90	3.00	2.25	2.23	2.30
November	5.65	8.00	3.75	4.50	4.98	4.00	3.90	3.25	3.30	4.70	2.00	2.83	3.00	2.25	2.30	2.30
December	5.93	6.63	3.75	4.50	4.91	4.00	3.90	3.00	3.30	3.65	2.00	2.75	2.88	2.25	2.30	2.30
Average	*5.81*	*7.76*	*4.73*	*3.97*	*4.98*	*4.39*	*3.85*	*3.60*	*3.26*	*4.95*	*2.49*	*2.38*	*3.04*	*2.57*	*2.27*	*2.30*

Wrought Iron and Steel Pipe Prices

Computed from discounts as per list, with "trimmings," for carload lots; price for base size pipe, ¾ to 3-in.

Steel Pipe, per Net Ton

	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
January	$36.10	$32.30	$36.10	$35.20	$34.20	$41.39	$64.84	$88.92	$83.36	$80.64	$77.30	$51.87	$61.13	$70.30	$70.30	$70.30
February	36.10	32.30	36.10	36.09	35.42	43.63	66.95	88.92	83.36	83.36	76.88	51.87	66.50	70.30	70.30	70.30
March	36.10	32.30	36.10	36.12	36.10	47.51	72.07	88.92	81.06	83.36	76.88	51.87	66.50	70.30	70.30	70.30
April	36.10	32.30	36.60	35.54	36.10	51.25	81.51	88.92	76.88	83.36	71.63	51.87	68.02	70.30	70.30	70.30
May	36.10	32.30	37.20	35.20	38.00	53.72	92.62	88.92	76.88	83.36	67.62	51.87	70.30	70.30	70.30	70.30
June	36.10	34.20	38.00	35.20	38.00	53.72	95.21	88.92	76.88	83.36	67.62	51.87	70.30	70.30	70.30	70.30
July	36.10	34.69	38.00	35.20	38.00	53.72	105.59	88.92	76.88	83.36	64.63	51.87	70.30	70.30	70.30	70.30
August	36.10	36.10	36.53	35.20	38.00	53.72	105.59	88.92	76.88	83.36	63.91	54.74	70.30	70.30	70.30	70.30
September	36.10	37.43	36.10	35.20	38.00	55.21	105.59	88.92	76.88	83.36	60.21	57.43	70.30	70.30	70.30	70.30
October	34.26	38.00	35.95	35.20	38.00	55.58	105.59	88.92	76.88	83.36	56.50	58.74	70.30	70.30	70.30	70.30
November	34.20	38.00	35.20	34.23	39.90	56.57	91.70	88.92	76.88	83.36	56.50	61.13	70.30	70.30	70.30	70.30
December	32.30	38.00	35.20	34.20	39.90	61.01	88.92	88.92	76.88	83.36	53.96	61.13	70.30	70.30	70.30	70.30
Average	*35.47*	*34.92*	*36.42*	*35.22*	*37.47*	*52.25*	*81.73*	*88.92*	*78.31*	*83.13*	*66.14*	*54.69*	*68.71*	*70.30*	*70.30*	*70.30*

Wrought Iron Pipe, per Net Ton

	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
January	$43.70	$43.70	$49.40	$51.30	$51.30	$58.64	$83.36	$122.27	$116.71	$115.60	$135.06	$100.96	$122.56	$131.10	$131.10	$127.82
February	43.70	43.70	49.40	51.30	51.30	62.16	85.48	122.27	116.71	119.49	136.16	100.96	127.82	131.10	131.10	127.82
March	43.70	43.70	49.40	51.30	51.30	66.03	90.65	122.27	114.41	119.49	136.16	100.96	127.82	131.10	127.82	127.82
April	43.70	43.70	50.00	51.30	51.30	69.78	101.89	122.27	110.22	119.49	125.66	100.96	129.02	131.10	127.82	127.82
May	43.70	43.70	50.48	51.30	53.20	72.25	113.00	122.27	110.22	119.49	117.63	100.96	131.10	131.10	127.82	127.82
June	43.70	43.70	51.30	51.30	53.20	72.25	114.85	122.27	110.22	119.49	117.63	100.96	131.10	131.10	127.82	127.82
July	43.70	45.60	51.30	51.30	53.20	72.25	122.27	122.27	110.22	119.49	111.65	100.96	131.10	131.10	127.82	127.82
August	43.70	45.60	51.30	51.30	53.20	72.25	122.27	122.27	110.22	119.49	110.22	105.74	131.10	131.10	127.82	127.82
September	43.70	46.93	51.30	51.30	53.20	73.73	122.27	122.27	110.22	119.49	105.59	116.33	131.10	131.10	127.82	127.82
October	43.70	47.50	51.30	51.30	53.20	74.10	122.27	122.27	110.22	119.49	100.96	120.41	131.10	131.10	127.82	127.82
November	41.70	47.50	51.30	51.30	55.10	75.07	122.27	122.27	110.22	119.49	100.96	120.41	131.10	131.10	127.82	127.82
December	43.70	47.50	51.30	51.30	55.10	79.50	122.27	122.27	110.22	119.49	100.96	120.41	131.10	131.10	127.82	127.82
Average	*43.70*	*45.24*	*50.65*	*51.30*	*52.88*	*70.67*	*110.24*	*122.27*	*111.65*	*119.16*	*116.55*	*107.50*	*129.67*	*131.10*	*128.37*	*127.82*

Cast Iron Pipe Prices, 1911 to 1926

At New York, 6-Inch, per Net Ton

	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
January	$22.00	$22.00	$25.00	$22.00	$20.00	$29.00	$41.50	$55.35	$65.70	$66.30	$63.30	$47.30	$54.90	$61.60	$54.60	$50.60
February	21.50	22.00	24.75	22.00	20.00	29.33	41.50	55.35	62.70	70.30	63.30	47.30	56.50	61.60	54.60	50.60
March	21.00	22.00	23.87	22.00	20.00	29.75	43.10	55.35	62.70	71.30	63.30	47.68	57.75	61.60	53.00	50.60
April	21.00	21.25	23.50	22.00	21.60	30.50	50.88	55.35	57.70	73.90	63.30	48.80	58.50	61.60	52.60	50.60
May	21.00	21.00	23.00	20.88	22.00	30.50	55.50	56.60	54.45	76.30	62.05	49.60	58.50	61.60	50.85	50.60
June	21.00	21.00	23.00	20.50	22.25	30.50	60.75	61.44	52.03	76.30	54.30	50.80	61.25	61.60	50.60	50.60
July	21.00	22.10	23.00	20.50	22.50	30.50	65.50	61.75	50.46	76.30	52.30	53.50	62.30	60.60	50.60	50.60
August	21.00	22.00	23.00	20.50	23.25	30.50	65.50	61.75	52.33	76.53	46.05	54.10	62.62	59.60	50.60	50.60
September	21.00	23.12	23.00	20.40	24.37	30.83	65.50	61.75	54.30	77.22	46.30	54.50	63.60	56.60	50.60	49.85
October	21.00	24.50	23.00	20.00	25.25	31.50	61.00	67.70	55.30	77.22	47.30	54.50	63.60	56.35	50.60	49.60
November	21.40	24.12	23.00	20.00	26.50	35.50	56.50	67.70	58.30	77.22	47.30	54.50	63.60*	55.60	50.60	49.60
December	22.00	24.62	22.33	20.00	27.60	41.00	56.50	67.70	61.30	68.87	47.30	54.75	63.60*	55.20	50.60	49.10
Average	*21.24*	*22.48*	*23.37*	*20.90*	*22.94*	*31.62*	*55.31*	*60.65*	*57.27*	*73.98*	*54.68*	*51.44*	*60.57*	*59.46*	*51.65*	*50.25*

*Concession of $2 to $3 per ton from this price to consumers willing to accept winter delivery.

Cast Iron Pipe, Delivered Chicago, 6 In. and Larger, per Net Ton

	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
January	$24.00	$24.67	$29.00	$25.00	$23.50	$29.00	$41.50	$54.30	$64.30	$67.55	$64.10	$42.50	$51.80	$56.20	$48.70	$49.20
February	24.25	25.00	29.00	25.00	23.50	29.50	41.75	54.30	61.80	71.30	64.10	41.60	53.20	56.20	49.95	49.20
March	24.50	25.00	27.83	24.20	23.50	29.50	43.00	54.30	60.55	72.80	64.10	42.10	54.20	56.20	47.60	49.20
April	24.50	25.00	28.10	24.00	23.50	30.50	53.00	54.30	56.80	74.80	64.10	42.85	57.20	56.20	46.70	49.20
May	24.50	25.00	26.50	24.00	23.50	30.50	55.50	55.81	54.30	76.80	60.10	44.60	60.20	55.20	47.07	49.20
June	24.50	25.00	26.50	24.00	23.70	30.50	60.75	60.83	51.80	76.80	52.85	46.10	60.20	54.70	47.70	48.90
July	24.50	25.60	26.20	24.00	24.00	30.50	65.50	62.05	52.60	76.80	48.85	45.57	60.20	54.80	48.20	47.95
August	24.50	27.13	26.00	24.00	24.00	30.50	65.50	61.80	55.30	78.18	43.20	46.40	60.20	53.45	49.20	48.30
September	24.50	28.00	26.00	24.00	24.70	31.00	65.50	61.80	55.80	82.10	42.60	47.45	59.95	51.80	49.20	47.58
October	24.50	28.00	26.00	24.00	25.75	31.50	53.50	66.80	59.00	83.10	42.60	51.20	57.40	49.70	49.20	47.20
November	24.50	28.75	25.63	24.00	27.00	36.25	54.25	66.80	59.80	83.10	42.90	51.20	55.45	48.20	50.20	47.20
December	24.50	29.00	25.00	23.50	27.77	41.00	55.21	66.80	64.40	68.60	43.10	51.20	55.20	47.60	50.20	46.70
Average	*24.44*	*26.85*	*26.81*	*24.14*	*24.54*	*31.69*	*54.58*	*59.99*	*58.04*	*76.00*	*52.72*	*46.06*	*57.10*	*53.85*	*48.66*	*48.32*

Southern Ohio No. 2 Foundry Iron, per Gross Ton, at Cincinnati

	1920	1921	1922	1923	1924	1925	1926
January	$40.93	$33.78	$22.15	$29.78	$25.18	$24.27	$23.27
February	44.18	32.03	22.03	30.28	26.03	24.27	22.92
March	45.18	29.93	21.38	32.68	25.78	23.87	22.89
April	46.20	28.28	22.78	33.14	25.39	23.15	21.99
May	46.80	27.03	25.28	32.23	24.39	21.77	21.76
June	46.80	25.73	25.53	30.53	22.53	21.27	20.89
July	46.80	23.93	26.40	28.71	21.58	21.27	21.29
August	47.73	22.53	30.18	28.08	21.78	21.77	21.39
September	48.92	23.13	34.28	27.03	22.15	21.77	21.39
October	48.28	23.53	34.53	26.93	22.28	21.90	21.39
November	46.28	22.73	31.83	24.78	22.90	23.27	21.89
December	38.13	22.27	29.28	24.78	23.88	23.27	21.89
Average	*45.52*	*26.49*	*27.14*	*28.75*	*23.66*	*22.65*	*21.91*

Six Years of Finished Iron and Steel, Chicago and Pittsburgh

Sheets, Bars and Beams at Chicago—Rivets, Cotton Ties and Cold-Finished Bars at Pittsburgh

Black Sheets, No. 28 Gage, at Chicago, Cents per Pound

	1920	1921	1922	1923	1924	1925	1926
January	4.75	4.73	3.38	3.69	4.17	3.75	3.50
February	5.27	4.57	3.38	3.69	4.19	3.75	3.50
March	5.77	4.40	3.38	3.90	4.14	3.75	3.50
April	5.77	4.21	3.46	4.25	4.03	3.65	3.48
May	5.77	4.38	3.53	4.19	3.99	3.48	3.40
June	5.77	4.15	3.53	4.19	3.99	3.32	3.31
July	7.02	3.76	3.49	4.19	3.84	3.35	3.30
August	7.77	3.33	3.57	4.19	3.84	3.35	3.30
September	7.76	3.19	3.69	4.12	3.93	3.35	3.33
October	7.07	3.34	3.69	4.09	3.65	3.31	3.43
November	6.15	3.38	3.69	4.09	3.68	3.43	3.50
December	4.73	3.38	3.69	4.09	3.75	3.50	3.50
Average	*6.10*	*3.86*	*3.54*	*4.06*	*3.93*	*3.50*	*3.42*

Galvanized Steel Sheets, No. 28 Gage, at Chicago, Cents per Pound

	1920	1921	1922	1923	1924	1925	1926
January	5.60	6.08	4.38	4.69	5.34	4.90	4.75
February	6.77	5.88	4.38	4.69	5.34	4.90	4.75
March	7.27	5.44	4.38	5.02	5.29	4.88	4.75
April	7.27	5.18	4.46	5.28	5.21	4.75	4.75
May	7.27	5.38	4.53	5.34	5.12	4.55	4.68
June	7.27	5.13	4.53	5.34	5.14	4.39	4.55
July	8.52	4.76	4.49	5.34	5.00	4.38	4.45
August	9.27	4.33	4.67	5.34	4.94	4.39	4.45
September	9.26	4.19	4.69	5.34	5.00	4.40	4.44
October	8.56	4.34	4.69	5.34	4.75	4.41	4.54
November	7.42	4.38	4.69	5.22	4.79	4.68	4.60
December	6.08	4.38	4.69	5.24	4.90	4.75	4.60
Average	*7.55*	*4.91*	*4.54*	*5.16*	*5.07*	*4.62*	*4.61*

Blue Annealed Sheets, Nos. 9 and 10 Gage, at Chicago, Cents per Pound

	1920	1921	1922	1923	1924	1925	1926
January	4.07	3.93	2.63	2.84	3.34	2.85	2.65
February	3.95	3.72	2.63	2.84	3.34	2.85	2.65
March	3.82	3.43	2.63	3.03	3.29	2.82	2.65
April	3.82	3.26	2.71	3.32	3.21	2.75	2.65
May	3.82	3.48	2.78	3.34	3.14	2.55	2.65
June	3.82	3.26	2.78	3.34	3.14	2.44	2.49
July	3.82	2.93	2.74	3.34	3.07	2.48	2.45
August	3.82	2.63	2.78	3.34	3.04	2.45	2.45
September	3.93	2.63	2.84	3.34	3.10	2.45	2.45
October	3.93	2.63	2.84	3.34	2.85	2.45	2.53
November	3.93	2.63	2.84	3.34	2.85	2.58	2.55
December	3.93	2.63	2.84	3.34	2.85	2.65	2.55
Average	*3.89*	*3.06*	*2.75*	*3.23*	*3.10*	*2.61*	*2.56*

Rail Steel Bars at Chicago Mill, Cents per Pound

	1920	1921	1922	1923	1924	1925	1926
January	3.25	2.60	1.56	2.00	2.30	2.03	2.00
February	3.25	2.41	1.50	2.10	2.30	2.10	2.00
March	3.50	2.23	1.50	2.28	2.30	2.10	2.00
April	3.75	2.25	1.55	2.33	2.30	2.10	2.00
May	3.75	2.05	1.60	2.30	2.20	2.10	1.98
June	3.75	1.95	1.63	2.28	2.15	2.02	1.96
July	3.75	1.90	1.70	2.30	2.10	2.00	1.98
August	3.95	1.76	1.89	2.30	2.05	2.00	2.00
September	4.00	1.75	2.00	2.30	2.00	2.00	2.00
October	3.81	1.68	2.00	2.30	2.00	2.00	2.00
November	3.15	1.65	2.00	2.30	2.00	2.00	1.96
December	2.67	1.75	2.00	2.30	2.00	2.00	1.90
Average	*3.56*	*1.99*	*1.75*	*2.25*	*2.14*	*2.04*	*1.98*

Cotton Tie Prices for Twenty-One Years

(Per Bundle of 45-Lb., f.o.b. Pittsburgh)

1905	$0.85	1913	$0.80	1920	$2.00
1906	0.85	1914	0.65	1921	1.30
1907	0.95	1915	0.85	1922	1.10
1908	0.85	1916	1.35	1923	1.60
1909	0.70	1917	2.10	1924	*1.40
1910	0.75	1918	2.10	1925	†1.25
1911	0.75	1919	1.70	1926	‡1.20
1912	0.70				

*F.o.b. Atlantic and Gulf ports.
†F.o.b. Gulf ports; $1.28, f.o.b. Atlantic ports.
‡F.o.b. Gulf ports; $1.22, f.o.b. Atlantic ports.

Common Bar Iron at Chicago, Cents per Pound

	1920	1921	1922	1923	1924	1925	1926
January	3.24	2.68	1.60	2.35	2.40	2.00	2.00
February	3.63	2.65	1.58	2.46	2.40	2.03	2.00
March	3.68	2.60	1.58	2.53	2.40	2.10	2.00
April	3.75	2.38	1.63	2.60	2.35	2.10	2.00
May	3.75	2.35	1.67	2.60	2.23	2.08	2.00
June	3.88	2.23	1.74	2.55	2.23	2.01	2.00
July	3.88	1.96	1.85	2.50	2.20	1.96	2.00
August	3.88	1.75	2.11	2.40	2.15	1.90	2.00
September	3.88	1.75	2.25	2.39	2.14	1.90	2.00
October	3.88	1.75	2.50	2.38	2.10	1.90	2.00
November	3.75	1.73	2.50	2.40	2.08	1.94	2.00
December	3.39	1.63	2.35	2.40	2.01	2.00	2.00
Average	*3.72*	*2.12*	*1.95*	*2.47*	*2.23*	*1.99*	*2.00*

Soft Steel Bars at Chicago, Cents per Pound

	1920	1921	1922	1923	1924	1925	1926
January	2.96	2.73	1.60	2.08	2.50	2.13	2.10
February	3.45	2.57	1.53	2.21	2.50	2.20	2.10
March	3.57	2.40	1.55	2.45	2.50	2.20	2.10
April	3.70	2.43	1.60	2.84	2.38	2.15	2.10
May	3.45	2.48	1.66	2.74	2.30	2.10	2.10
June	3.45	2.37	1.75	2.60	2.25	2.10	2.10
July	3.45	2.21	1.75	2.60	2.19	2.10	2.10
August	3.47	1.96	2.05	2.60	2.13	2.10	2.10
September	3.50	1.78	2.10	2.50	2.02	2.10	2.10
October	3.31	1.75	2.10	2.50	2.00	2.10	2.10
November	3.04	1.67	2.10	2.50	2.05	2.10	2.10
December	2.73	1.60	2.10	2.50	2.10	2.10	2.10
Average	*3.34*	*2.16*	*1.83*	*2.51*	*2.24*	*2.12*	*2.10*

Structural Steel Beams at Chicago, Cents per Pound

	1920	1921	1922	1923	1924	1925	1926
January	3.72	2.83	1.60	2.18	2.60	2.23	2.10
February	3.18	2.67	1.53	2.31	2.60	2.30	2.10
March	3.50	2.50	1.55	2.52	2.60	2.30	2.10
April	3.50	2.53	1.60	2.84	2.50	2.25	2.10
May	3.50	2.58	1.66	2.84	2.45	2.20	2.10
June	3.45	2.48	1.75	2.70	2.39	2.18	2.10
July	3.25	2.28	1.75	2.70	2.37	2.10	2.10
August	3.14	1.99	2.05	2.70	2.30	2.10	2.10
September	3.23	1.79	2.20	2.60	2.06	2.10	2.10
October	3.20	1.75	2.20	2.60	2.00	2.10	2.10
November	3.07	1.69	2.20	2.60	2.15	2.10	2.10
December	2.83	1.63	2.20	2.60	2.20	2.10	2.10
Average	*3.22*	*2.23*	*1.86*	*2.59*	*2.33*	*2.17*	*2.10*

Cold-Finished Steel Bars, Base per 100 Pounds, f.o.b. Pittsburgh

	1920	1921	1922	1923	1924	1925	1926
January	$3.60	$3.60	$1.94	$2.53	$3.00	$2.80	$2.50
February	3.85	3.60	1.90	2.73	2.95	2.80	2.50
March	5.00	3.20	1.80	2.85	2.98	2.72	2.50
April	5.00	3.05	1.85	3.00	3.00	2.70	2.50
May	5.00	3.10	1.94	3.25	2.90	2.70	2.50
June	5.00	3.00	2.03	3.25	2.90	2.60	2.50
July	6.00	2.69	2.10	3.25	2.84	2.60	2.50
August	6.00	2.40	2.23	3.25	2.80	2.50	2.50
September	4.69	2.36	2.50	3.25	2.74	2.46	2.50
October	4.06	2.18	2.50	3.10	2.70	2.40	2.40
November	3.92	2.09	2.50	2.95	2.70	2.46	2.30
December	3.60	2.00	2.50	3.00	2.78	2.50	2.30
Average	*4.64*	*2.77*	*2.15*	*3.03*	*2.86*	*2.61*	*2.46*

Large Structural Rivets, Base per 100 Pounds, f.o.b. Pittsburgh

	1920	1921	1922	1923	1924	1925	1926
January	$4.11	$4.13	$3.25	$3.00	$2.90	$2.60	$2.60
February	4.33	3.90	2.18	3.00	2.75	2.60	2.53
March	4.50	3.78	2.00	3.25	2.75	2.60	2.50
April	4.50	3.55	2.10	3.25	2.65	2.58	2.50
May	4.50	3.32	2.24	3.25	2.65	2.45	2.50
June	4.50	3.03	2.36	3.25	2.61	2.40	2.50
July	4.50	2.71	2.46	3.13	2.60	2.40	2.50
August	4.50	2.50	2.65	3.00	2.55	2.40	2.50
September	4.50	2.24	3.00	2.95	2.60	2.40	2.48
October	4.75	2.36	3.12	2.75	2.53	2.40	2.45
November	4.70	2.25	3.10	2.68	2.60	2.60	2.45
December	4.44	2.25	3.00	2.90	2.60	2.60	2.40
Average	*4.49*	*3.00*	*2.55*	*3.02*	*2.65*	*2.50*	*2.50*

Monthly Averages of Ferroalloy Quotations

Ferromanganese (80 Per Cent) Prices in Dollars per Gross Ton, at Seaboard

	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
Jan.	$38.04	$41.00	$68.00	$44.40	$68.00	$150.00	$175.00	$250.00	$255.00	$146.00	$112.50	$58.35	$105.00	$108.70	$112.50	$115.00
Feb.	37.69	41.00	65.00	39.25	69.75	207.50	231.25	250.00	215.00	172.50	100.00	60.42	107.50	107.50	115.00	115.00
March	37.10	41.00	65.00	38.50	100.00	349.60	290.00	250.00	175.00	216.25	96.00	62.50	113.75	107.50	115.00	97.60
April	36.75	43.00	61.00	38.00	100.00	406.25	362.50	290.00	150.00	240.00	90.00	64.37	120.00	107.50	115.00	88.00
May	36.50	47.50	61.00	38.00	100.00	387.50	420.50	290.00	138.40	250.00	85.00	66.87	128.00	107.50	115.00	88.00
June	36.50	49.25	61.00	38.00	100.00	270.00	443.75	290.00	121.00	225.00	80.00	67.50	128.75	107.50	115.00	88.00
July	36.50	48.88	59.00	37.20	109.00	175.00	406.25	290.00	111.00	225.00	70.60	67.50	*119.50	106.50	115.00	88.00
Aug.	36.70	52.40	56.38	108.33	127.25	172.00	400.00	290.00	101.25	198.75	70.00	67.50	117.50	95.75	115.00	88.00
Sept.	37.75	59.63	56.00	90.00	117.00	169.75	387.50	285.00	98.75	170.00	65.80	75.63	*111.25	90.00	115.00	88.00
Oct.	38.50	67.80	50.10	70.40	105.00	162.25	310.00	285.00	105.00	170.00	63.00	100.00	*110.00	90.00	115.00	88.00
Nov.	38.40	73.75	50.00	68.00	105.00	160.80	256.00	285.00	112.50	170.00	61.50	100.00	*108.75	98.75	115.00	96.60
Dec.	39.75	75.00	47.00	72.20	106.00	169.75	243.75	275.00	122.50	135.00	60.00	100.00	*108.25	107.00	115.00	100.00
Average	*37.51*	*53.35*	*58.29*	*56.86*	*105.83*	*231.70*	*327.21*	*277.50*	*142.12*	*193.21*	*79.53*	*74.82*	*114.85*	*102.85*	*114.79*	*95.02*

*Price at furnace, where lower than price at seaboard.

Spiegeleisen (19 to 21 Per Cent), Dollars per Gross Ton at Furnace

	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
Jan.	$25.00	$25.00	$30.38	$60.00	$60.00	$66.00	$51.40	$45.00	$26.00	$34.40	$38.00	$33.00	$32.00
Feb.	25.00	25.00	36.25	68.75	61.25	60.75	58.75	40.00	38.00	35.50	38.00	33.00	32.00
March	25.00	25.00	57.00	75.00	71.25	47.00	60.00	35.00	29.40	40.00	38.00	33.00	32.00
April	25.00	25.00	65.00	75.00	80.75	45.00	67.60	34.00	32.25	45.00	36.80	33.00	32.00
May	25.00	25.00	65.00	81.00	84.00	37.40	75.00	32.00	35.00	52.50	36.00	33.00	32.00
June	25.00	25.00	61.00	82.50	89.00	31.25	75.00	32.00	36.00	48.50	35.00	32.80	32.00
July	25.00	25.00	52.50	85.00	89.00	35.00	75.00	27.00	36.00	44.00	34.20	32.00	32.00
Aug.	25.00	25.00	45.00	85.00	89.00	35.00	80.00	26.00	37.80	46.75	32.50	32.00	32.00
Sept.	25.00	26.60	45.00	82.50	83.75	35.00	82.00	26.00	38.25	43.75	31.40	31.80	32.00
Oct.	25.00	29.25	42.75	76.25	82.00	35.00	81.88	26.00	38.00	43.75	30.75	31.25	32.00
Nov.	25.00	29.25	45.40	66.00	80.25	37.00	75.62	26.00	37.50	41.25	30.25	32.00	37.40
Dec.	25.00	29.25	55.00	60.00	74.38	40.00	59.10	26.00	37.50	39.00	32.00	32.00	36.50
Average	*25.00*	*26.20*	*50.02*	*74.75*	*78.72*	*42.03*	*70.11*	*31.25*	*34.31*	*42.87*	*34.41*	*32.40*	*32.83*

50 Per Cent Ferrosilicon (Per Gross Ton, Delivered East of Mississippi)

	1920	1921	1922	1923	1924	1925	1926
January	$80.00	$75.00	$54.00	$82.50	$75.00	$82.50	$85.00
February	85.00	93.00	55.00	83.75	75.00	82.50	85.00
March	85.00	92.40	55.00	90.00	75.00	82.50	85.00
April	85.00	86.25	55.00	92.50	75.00	82.50	85.00
May	80.00	76.40	55.00	94.50	75.00	82.50	85.00
June	80.00	69.75	55.00	90.00	75.00	82.50	85.00
July	80.00	66.00	55.00	82.50	71.00	82.50	85.00
August	75.00	60.80	55.00	82.50	71.25	82.50	85.00
September	75.00	60.00	55.00	82.50	72.00	82.50	85.00
October	75.00	58.50	67.00	81.00	71.00	82.50	85.00
November	75.00	55.80	75.00	80.63	70.00	82.50	85.00
December	75.00	56.00	82.50	76.25	75.00	82.50	85.00
Average	*79.17*	*70.83*	*59.88*	*84.89*	*73.35*	*82.50*	*85.00*

Connellsville Coke Prices for Nineteen Years

Prompt Connellsville Furnace Coke, per Net Ton at Oven

	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
January	$1.92	$1.59	$2.55	$1.40	$1.82	$3.88	$1.85	$1.50	$2.94	$9.50	$6.00	$5.65	$6.00	$5.06	$2.75	$8.05	$3.94	$3.94	$7.19
February	1.86	1.59	2.12	1.45	1.78	2.52	1.85	1.50	3.38	9.62	6.00	4.44	6.00	4.50	3.04	7.13	4.08	3.63	7.31
March	1.72	1.60	2.00	1.55	2.12	2.40	1.90	1.50	3.47	9.60	6.00	4.06	6.00	4.35	3.25	7.25	4.08	3.35	3.05
April	1.57	1.60	1.77	1.59	2.39	2.15	1.86	1.50	2.41	7.38	6.00	3.65	9.60	3.50	4.48	6.31	3.75	3.04	3.00
May	1.50	1.57	1.66	1.50	2.28	2.13	1.77	1.50	2.30	7.80	6.00	3.69	12.00	3.25	6.00	5.15	3.25	3.00	2.91
June	1.55	1.52	1.65	1.42	2.02	2.11	1.75	1.56	2.49	11.25	6.00	4.00	15.00	3.00	6.75	4.75	3.19	2.77	2.83
July	1.57	1.58	1.59	1.44	2.21	2.45	1.75	1.64	2.75	12.75	6.00	4.07	17.20	2.81	10.75	4.55	3.00	2.82	2.84
August	1.50	1.66	1.57	1.46	2.21	2.50	1.70	1.50	2.80	13.60	6.00	4.31	17.75	2.75	12.80	4.56	3.00	3.06	2.95
September	1.50	2.39	1.60	1.50	2.37	2.29	1.65	1.61	2.94	11.12	6.00	4.56	16.70	3.15	11.13	4.50	3.00	3.49	3.38
October	1.53	2.76	1.59	1.50	2.41	2.98	1.60	2.03	4.88	6.00	6.00	4.52	15.12	3.28	9.60	3.85	3.00	6.13	3.63
November	1.72	2.74	1.50	1.52	3.94	1.82	1.52	2.28	6.90	6.00	6.00	5.87	8.26	3.03	7.19	3.81	3.04	5.75	4.43
December	1.82	2.67	1.44	1.60	4.00	1.75	1.50	2.64	8.38	6.00	6.00	6.12	6.20	2.75	7.00	4.00	3.68	4.32	3.50
Average	*1.65*	*1.94*	*1.75*	*1.49*	*2.55*	*2.42*	*1.73*	*1.73*	*3.80*	*9.22*	*6.00*	*4.58*	*11.32*	*3.45*	*7.06*	*5.33*	*3.42*	*3.78*	*3.92*

Prompt Connellsville Foundry Coke, per Net Ton at Oven

	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
January	$2.45	$2.00	$2.90	$1.90	$1.97	$4.40	$2.50	$2.00	$3.50	$9.75	$7.00	$6.25	$7.00	$6.38	$3.75	$8.70	$4.75	$4.88	$7.75
February	2.39	1.95	2.70	2.10	2.09	3.25	2.50	2.00	3.50	11.00	7.00	5.00	7.00	5.63	4.00	8.25	4.88	4.31	8.31
March	2.25	1.95	2.60	2.05	2.56	3.00	2.45	2.00	3.75	11.60	7.00	4.94	7.00	5.45	4.25	8.38	4.88	4.15	4.40
April	2.22	1.86	2.45	2.00	2.69	3.00	2.40	2.00	3.56	9.13	7.00	4.30	10.20	4.75	5.06	7.56	4.75	4.00	4.06
May	2.03	1.85	2.20	1.81	2.58	2.85	2.40	2.00	3.25	8.90	7.00	4.31	13.00	4.50	6.30	6.15	4.69	4.00	4.00
June	2.00	1.80	2.17	1.76	2.40	2.80	2.32	2.00	3.25	11.72	7.00	4.56	15.75	4.45	7.25	5.56	4.38	3.80	4.00
July	2.00	2.00	2.15	1.82	2.40	2.70	2.22	2.05	3.25	13.25	7.00	5.00	17.80	4.06	11.00	5.35	4.10	3.75	4.00
August	1.92	1.95	2.15	1.85	2.40	2.90	2.25	2.00	3.30	13.20	7.00	5.25	18.88	3.75	13.90	5.38	4.00	3.88	4.00
September	1.90	2.55	2.12	1.85	2.54	2.90	2.10	2.07	3.31	11.75	7.00	5.80	17.70	4.15	12.50	5.50	4.00	4.25	4.38
October	2.10	2.90	2.10	1.81	3.65	2.81	2.00	2.35	3.88	6.00	7.00	6.25	16.38	4.38	11.70	4.80	4.00	6.31	4.63
November	2.20	3.25	2.05	1.85	4.25	2.60	1.92	2.88	7.10	7.00	7.00	7.00	9.50	4.19	8.38	4.81	4.06	6.81	5.50
December	2.25	3.20	1.97	1.90	4.50	2.50	1.90	2.95	8.63	7.00	7.00	7.00	7.00	3.81	7.88	4.81	4.55	5.20	4.50
Average	*2.14*	*2.27*	*2.30*	*1.89*	*2.84*	*2.98*	*2.25*	*2.19*	*4.19*	*10.03*	*7.00*	*5.47*	*12.27*	*4.63*	*8.00*	*6.27*	*4.42*	*4.61*	*4.96*

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Monthly Averages of Ferroalloy Quotations

Ferromanganese (80 Per Cent) Prices in Dollars per Gross Ton, at Seaboard

	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
Jan.	$38.04	$41.00	$68.00	$44.40	$68.00	$150.00	$175.00	$250.00	$255.00	$146.00	$112.50	$58.35	$105.00	$108.70	$112.50	$115.00
Feb.	37.69	41.00	65.00	39.25	69.75	207.50	231.25	250.00	215.00	172.50	100.00	60.42	107.50	107.50	115.00	115.00
March	37.10	41.00	65.00	38.50	100.00	349.60	290.00	250.00	175.00	216.25	96.00	62.50	113.75	107.50	115.00	97.60
April	36.75	43.00	61.00	38.00	100.00	406.25	362.50	290.00	150.00	240.00	90.00	64.37	120.00	107.50	115.00	88.00
May	36.50	47.50	61.00	38.00	100.00	387.50	420.50	290.00	138.40	250.00	85.00	66.87	128.00	107.50	115.00	88.00
June	36.50	49.25	61.00	38.00	100.00	270.00	443.75	290.00	121.00	225.00	80.00	67.50	128.75	107.50	115.00	88.00
July	36.50	48.88	59.00	37.20	109.00	175.00	406.25	290.00	111.00	225.00	70.60	67.50	*119.50	106.50	115.00	88.00
Aug.	36.70	52.40	56.38	108.33	127.25	172.00	400.00	290.00	101.25	198.75	70.00	67.50	117.50	95.75	115.00	88.00
Sept.	37.75	59.63	56.00	90.00	117.00	169.75	387.50	285.00	98.75	170.00	65.80	75.63	*111.25	90.00	115.00	88.00
Oct.	38.50	67.80	50.10	70.40	105.00	162.25	310.00	285.00	105.00	170.00	63.00	100.00	*110.00	90.00	115.00	88.00
Nov.	38.40	73.75	50.00	68.00	105.00	160.80	256.00	285.00	112.50	170.00	61.50	100.00	*108.75	98.75	115.00	96.60
Dec.	39.75	75.00	47.00	72.20	106.00	169.75	243.75	275.00	122.50	135.00	60.00	100.00	*108.25	107.00	115.00	100.00
Average	*37.31*	*53.35*	*58.29*	*56.86*	*105.83*	*231.70*	*327.21*	*277.50*	*142.12*	*193.21*	*79.53*	*74.28*	*114.85*	*102.85*	*114.79*	*95.02*

*Price at furnace, where lower than price at seaboard.

Spiegeleisen (19 to 21 Per Cent), Dollars per Gross Ton at Furnace

	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
Jan.	$25.00	$25.00	$30.38	$60.00	$60.00	$66.00	$51.40	$45.00	$26.00	$34.40	$38.00	$33.00	$32.00
Feb.	25.00	25.00	36.25	68.75	61.25	60.75	58.75	40.00	38.00	35.50	38.00	33.00	32.00
March	25.00	25.00	57.00	75.00	71.25	47.00	60.00	35.00	29.40	40.00	38.00	33.00	32.00
April	25.00	25.00	65.00	75.00	80.75	45.00	67.60	34.00	32.25	46.00	36.80	33.00	32.00
May	25.00	25.00	65.00	81.00	84.00	37.40	75.00	32.00	35.00	52.50	36.00	33.00	32.00
June	25.00	25.00	61.00	82.50	89.00	31.25	75.00	32.00	36.00	48.50	35.00	32.80	32.00
July	25.00	25.00	52.50	85.00	89.00	35.00	75.00	27.00	36.00	44.00	34.20	32.00	32.00
Aug.	25.00	25.00	45.00	85.00	89.00	35.00	80.00	26.00	37.80	46.75	32.50	32.00	32.00
Sept.	25.00	26.60	45.00	82.50	83.75	35.00	82.00	26.00	38.25	43.75	31.40	31.80	32.00
Oct.	25.00	29.25	42.75	76.25	82.00	35.00	81.88	26.00	38.00	43.75	30.75	31.25	32.00
Nov.	25.00	29.25	45.40	66.00	80.25	37.00	75.62	26.00	37.50	41.25	30.25	32.00	37.40
Dec.	25.00	29.25	55.00	60.00	74.38	40.00	59.10	26.00	37.50	39.00	32.00	32.00	36.50
Average	*25.00*	*26.20*	*50.02*	*74.75*	*78.72*	*42.03*	*70.11*	*31.25*	*34.31*	*42.87*	*34.41*	*32.40*	*32.83*

50 Per Cent Ferrosilicon (Per Gross Ton, Delivered East of Mississippi)

	1920	1921	1922	1923	1924	1925	1926
January	$80.00	$75.00	$54.00	$82.50	$75.00	$82.50	$85.00
February	85.00	93.00	55.00	83.75	75.00	82.50	85.00
March	85.00	92.40	55.00	90.00	75.00	82.50	85.00
April	85.00	86.25	55.00	92.50	75.00	82.50	85.00
May	80.00	76.40	55.00	94.50	75.00	82.50	85.00
June	80.00	69.75	55.00	90.00	75.00	82.50	85.00
July	80.00	66.00	55.00	82.50	71.00	82.50	85.00
August	75.00	60.80	55.00	82.50	71.25	82.50	85.00
September	75.00	60.00	55.00	82.50	72.00	82.50	85.00
October	75.00	58.50	67.00	81.00	71.00	82.50	85.00
November	75.00	55.80	75.00	80.63	70.00	82.50	85.00
December	75.00	56.00	82.50	76.25	75.00	82.50	85.00
Average	*79.17*	*70.83*	*59.88*	*84.89*	*73.35*	*82.50*	*85.00*

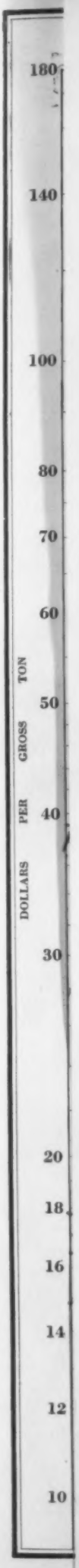
Connellsville Coke Prices for Nineteen Years

Prompt Connellsville Furnace Coke, per Net Ton at Oven

	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
January	$1.92	$1.59	$2.55	$1.40	$1.82	$3.88	$1.85	$1.50	$2.94	$9.50	$6.00	$5.65	$6.00	$5.06	$2.75	$8.05	$3.94	$3.94	$7.19
February	1.86	1.59	2.12	1.45	1.78	2.52	1.85	1.50	3.38	9.62	6.00	4.44	6.00	4.50	3.04	7.13	4.08	3.63	7.31
March	1.72	1.60	2.00	1.55	2.12	2.40	1.90	1.50	3.47	9.60	6.00	4.06	6.00	4.35	3.25	7.25	4.08	3.35	3.05
April	1.57	1.60	1.77	1.59	2.39	2.15	1.86	1.50	2.41	7.38	6.00	3.65	9.60	3.50	4.48	6.31	3.75	3.04	3.00
May	1.50	1.57	1.66	1.50	2.28	2.13	1.77	1.50	2.30	7.80	6.00	3.69	12.00	3.25	6.00	5.15	3.25	3.00	2.91
June	1.55	1.52	1.65	1.42	2.02	2.11	1.75	1.56	2.49	11.25	6.00	4.00	15.00	3.00	6.75	4.75	3.19	2.77	2.83
July	1.57	1.58	1.59	1.44	2.21	2.45	1.75	1.64	2.75	12.75	6.00	4.07	17.20	2.81	10.75	4.55	3.00	2.83	2.84
August	1.50	1.66	1.57	1.46	2.21	2.50	1.70	1.50	2.80	13.60	6.00	4.31	17.75	2.75	12.80	4.56	3.00	3.06	2.95
September	1.50	2.39	1.60	1.50	2.37	2.29	1.65	1.61	2.94	11.12	6.00	4.56	16.70	3.15	11.13	4.50	3.00	3.49	3.38
October	1.53	2.76	1.59	1.50	3.41	2.98	1.60	2.03	4.88	6.00	6.00	4.52	15.12	3.28	9.60	3.85	3.00	6.13	3.63
November	1.72	2.74	1.50	1.52	3.94	1.82	1.52	2.28	6.90	6.00	6.00	5.87	8.26	3.03	7.19	3.81	3.04	5.75	4.43
December	1.82	2.67	1.44	1.60	4.00	1.75	1.50	2.64	8.38	6.00	6.00	6.12	6.20	2.75	7.00	4.00	3.68	4.32	3.50
Average	*1.65*	*1.94*	*1.75*	*1.49*	*2.55*	*2.42*	*1.73*	*1.75*	*3.80*	*9.22*	*6.00*	*4.58*	*11.32*	*3.45*	*7.06*	*5.33*	*3.42*	*3.78*	*3.92*

Prompt Connellsville Foundry Coke, per Net Ton at Oven

	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
January	$2.45	$2.00	$2.90	$1.90	$1.97	$4.40	$2.50	$2.00	$3.50	$9.75	$7.00	$6.25	$7.00	$6.38	$3.75	$8.70	$4.75	$4.88	$7.75
February	2.39	1.95	2.70	2.10	2.09	3.25	2.50	2.00	3.50	11.00	7.00	5.00	7.00	5.63	4.00	8.25	4.88	4.31	8.31
March	2.25	1.95	2.60	2.05	2.56	3.00	2.45	2.00	3.75	11.60	7.00	4.94	7.00	5.45	4.25	8.38	4.88	4.15	4.40
April	2.22	1.86	2.45	2.00	2.69	3.00	2.40	2.00	3.56	9.13	7.00	4.30	10.20	4.75	5.06	7.56	4.75	4.00	4.06
May	2.03	1.85	2.20	1.81	2.58	2.85	2.40	2.00	3.25	8.90	7.00	4.31	13.00	4.50	6.30	6.15	4.69	4.00	4.00
June	2.00	1.80	2.17	1.76	2.40	2.80	2.32	2.00	3.25	11.72	7.00	4.56	15.75	4.45	7.25	5.56	4.38	3.80	4.00
July	2.00	2.00	2.15	1.82	2.40	2.70	2.22	2.05	3.25	13.25	7.00	5.00	17.80	4.06	11.00	5.35	4.10	3.75	4.00
August	1.92	1.95	2.15	1.85	2.40	2.90	2.25	2.00	3.30	13.20	7.00	5.25	18.88	3.75	13.90	5.38	4.00	3.88	4.00
September	1.90	2.55	2.13	1.85	2.54	2.90	2.10	2.07	3.31	11.75	7.00	5.80	17.70	4.15	12.50	5.50	4.00	4.25	4.38
October	2.10	2.90	2.10	1.81	3.65	2.81	2.00	2.35	3.88	6.00	7.00	6.25	16.38	4.38	11.70	4.80	4.00	6.31	4.63
November	2.20	3.25	2.05	1.85	4.25	2.60	1.92	2.88	7.10	7.00	7.00	7.00	9.50	4.19	8.38	4.81	4.06	6.81	5.50
December	2.26	3.20	1.97	1.90	4.50	2.50	1.90	2.95	8.63	7.00	7.00	7.00	7.00	3.81	7.88	4.81	4.55	5.20	4.50
Average	*2.14*	*2.27*	*2.30*	*1.89*	*2.84*	*2.98*	*2.25*	*2.19*	*4.19*	*10.03*	*7.00*	*5.47*	*12.27*	*4.63*	*8.00*	*6.27*	*4.42*	*4.61*	*4.96*



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Monthly Averages of Ferroalloy Quotations

Ferromanganese (80 Per Cent) Prices in Dollars per Gross Ton, at Seaboard

	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
Jan.	$38.04	$41.00	$68.00	$44.40	$68.00	$150.00	$175.00	$250.00	$255.00	$146.00	$112.50	$58.35	$105.00	$108.70	$112.50	$115.00
Feb.	37.69	41.00	65.00	39.25	69.75	207.50	231.25	250.00	215.00	172.50	100.00	60.42	107.50	107.50	115.00	115.00
March	37.10	41.00	65.00	38.50	100.00	349.60	290.00	250.00	175.00	216.25	96.00	62.50	113.75	107.50	115.00	97.60
April	36.75	43.00	61.00	38.00	100.00	406.25	362.50	290.00	150.00	240.00	90.00	64.37	120.00	107.50	115.00	88.00
May	36.50	47.50	61.00	38.00	100.00	387.50	420.50	290.00	138.40	250.00	85.00	66.87	128.00	107.50	115.00	88.00
June	36.50	49.25	61.00	38.00	100.00	270.00	443.75	290.00	121.00	225.00	80.00	67.50	128.75	107.50	115.00	88.00
July	36.50	48.88	59.00	37.20	109.00	175.00	406.25	290.00	111.00	225.00	70.60	67.50	*119.50	106.50	115.00	88.00
Aug.	36.70	52.40	56.38	108.33	127.25	172.00	400.00	290.00	101.25	198.75	70.00	67.50	117.50	95.75	115.00	88.00
Sept.	37.75	59.63	56.00	90.00	117.00	169.75	387.50	285.00	98.75	170.00	65.80	75.63	*111.25	90.00	115.00	88.00
Oct.	38.50	67.80	50.10	70.40	105.00	162.25	310.00	285.00	105.00	170.00	63.00	100.00	*110.00	90.00	115.00	88.00
Nov.	38.40	73.75	50.00	68.00	105.00	160.80	256.00	285.00	112.50	170.00	61.50	100.00	*108.75	98.75	115.00	96.60
Dec.	39.75	75.00	47.00	72.20	106.00	169.75	243.75	275.00	122.50	135.00	60.00	100.00	*108.25	107.00	115.00	100.00
Average	*37.51*	*53.35*	*58.29*	*56.86*	*105.83*	*231.70*	*327.21*	*277.50*	*142.12*	*193.21*	*79.53*	*74.22*	*114.85*	*102.85*	*114.79*	*95.02*

*Price at furnace, where lower than price at seaboard.

Spiegeleisen (19 to 21 Per Cent), Dollars per Gross Ton at Furnace

	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
Jan.	$25.00	$25.00	$30.38	$60.00	$60.00	$66.00	$51.40	$45.00	$26.00	$34.40	$38.00	$33.00	$32.00
Feb.	25.00	25.00	36.25	68.75	61.25	60.75	58.75	40.00	38.00	35.50	38.00	33.00	32.00
March	25.00	25.00	57.00	75.00	71.25	47.00	60.00	35.00	29.40	40.00	38.00	33.00	32.00
April	25.00	25.00	65.00	75.00	80.75	45.00	67.60	34.00	32.25	45.00	36.80	33.00	32.00
May	25.00	25.00	65.00	81.00	84.00	37.40	75.00	32.00	35.00	52.50	36.00	33.00	32.00
June	25.00	25.00	61.00	82.50	89.00	31.25	75.00	32.00	36.00	48.50	35.00	32.80	32.00
July	25.00	25.00	52.50	85.00	89.00	35.00	75.00	27.00	36.00	44.00	34.20	32.00	32.00
Aug.	25.00	25.00	45.00	85.00	89.00	35.00	80.00	26.00	37.80	46.75	32.50	32.00	32.00
Sept.	25.00	26.60	45.00	82.50	83.75	35.00	82.00	26.00	38.25	43.75	31.40	31.80	32.00
Oct.	25.00	29.25	42.75	76.25	82.00	35.00	81.88	26.00	38.00	43.75	30.75	31.25	32.00
Nov.	25.00	29.25	45.40	66.00	80.25	37.00	75.62	26.00	37.50	41.25	30.25	32.00	37.40
Dec.	25.00	29.25	55.00	60.00	74.38	40.00	59.10	26.00	37.50	39.00	32.00	32.00	36.50
Average	*25.00*	*26.20*	*50.02*	*74.75*	*78.72*	*42.03*	*70.11*	*31.25*	*34.31*	*42.87*	*34.41*	*32.40*	*32.83*

50 Per Cent Ferrosilicon (Per Gross Ton, Delivered East of Mississippi)

	1920	1921	1922	1923	1924	1925	1926
January	$80.00	$75.00	$54.00	$82.50	$75.00	$82.50	$85.00
February	85.00	93.00	55.00	83.75	75.00	82.50	85.00
March	85.00	92.40	55.00	90.00	75.00	82.50	85.00
April	85.00	86.25	55.00	92.50	75.00	82.50	85.00
May	80.00	76.40	55.00	94.50	75.00	82.50	85.00
June	80.00	69.75	55.00	90.00	75.00	82.50	85.00
July	80.00	66.00	55.00	82.50	71.00	82.50	85.00
August	75.00	60.80	55.00	82.50	71.25	82.50	85.00
September	75.00	60.00	55.00	82.50	72.00	82.50	85.00
October	75.00	58.50	67.00	81.00	71.00	82.50	85.00
November	75.00	55.80	75.00	80.62	70.00	82.50	85.00
December	75.00	56.00	82.50	76.25	75.00	82.50	85.00
Average	*79.17*	*70.83*	*59.88*	*84.89*	*73.35*	*82.50*	*85.00*

Connellsville Coke Prices for Nineteen Years

Prompt Connellsville Furnace Coke, per Net Ton at Oven

	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
January	$1.92	$1.59	$2.55	$1.40	$1.82	$3.88	$1.85	$1.50	$2.94	$9.50	$6.00	$5.65	$6.00	$5.06	$2.75	$8.05	$3.94	$3.94	$7.19
February	1.86	1.59	2.12	1.45	1.78	2.52	1.85	1.50	3.38	9.62	6.00	4.44	6.00	4.50	3.04	7.13	4.08	3.63	7.31
March	1.72	1.60	2.00	1.55	2.12	2.40	1.90	1.50	3.47	9.60	6.00	4.06	6.00	4.35	3.25	7.25	4.08	3.35	3.05
April	1.57	1.60	1.77	1.59	2.39	2.15	1.86	1.50	2.41	7.38	6.00	3.65	9.60	3.50	4.48	6.31	3.75	3.04	3.00
May	1.50	1.57	1.66	1.50	2.28	2.13	1.77	1.50	2.30	7.80	6.00	3.69	12.00	3.25	6.00	5.15	3.25	3.00	2.91
June	1.55	1.52	1.65	1.42	2.02	2.11	1.75	1.56	2.49	11.25	6.00	4.00	15.00	3.00	6.75	4.75	3.19	2.77	2.83
July	1.57	1.58	1.59	1.44	2.21	2.45	1.75	1.64	2.75	12.75	6.00	4.07	17.20	2.81	10.75	4.55	3.00	2.83	2.84
August	1.50	1.66	1.57	1.46	2.21	2.50	1.70	1.50	2.80	13.60	6.00	4.31	17.75	2.75	12.80	4.56	3.00	3.06	2.95
September	1.50	2.39	1.60	1.50	2.37	2.29	1.65	1.61	2.94	11.12	6.00	4.56	16.70	3.15	11.13	4.50	3.00	3.49	3.38
October	1.53	2.76	1.59	1.50	3.41	2.98	1.60	2.03	4.88	6.00	6.00	4.52	15.12	3.28	9.60	3.85	3.00	6.13	3.63
November	1.72	2.74	1.50	1.52	3.94	1.82	1.52	2.28	6.90	6.00	6.00	5.87	8.26	3.03	7.19	3.81	3.04	5.75	4.43
December	1.82	2.67	1.44	1.60	4.00	1.75	1.50	2.64	8.38	6.00	6.00	6.12	6.20	2.75	7.00	4.00	3.68	4.32	3.50
Average	*1.65*	*1.94*	*1.75*	*1.49*	*2.55*	*2.42*	*1.73*	*1.73*	*3.80*	*9.22*	*6.00*	*4.58*	*11.32*	*3.45*	*7.06*	*5.33*	*3.42*	*3.78*	*3.92*

Prompt Connellsville Foundry Coke, per Net Ton at Oven

	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
January	$2.45	$2.00	$2.90	$1.90	$1.97	$4.40	$2.50	$2.00	$3.50	$9.75	$7.00	$6.25	$7.00	$6.38	$3.75	$8.70	$4.75	$4.88	$7.75
February	2.39	1.95	2.70	2.10	2.09	3.25	2.50	2.00	3.50	11.00	7.00	5.00	7.00	5.63	4.00	8.25	4.88	4.31	8.31
March	2.25	1.95	2.60	2.05	2.56	3.00	2.45	2.00	3.75	11.60	7.00	4.94	7.00	5.45	4.25	8.38	4.88	4.15	4.40
April	2.22	1.86	2.45	2.00	2.69	3.00	2.40	2.00	3.56	9.13	7.00	4.30	10.20	4.75	5.06	7.56	4.75	4.00	4.06
May	2.03	1.85	2.20	1.81	2.58	2.85	2.40	2.00	3.25	8.90	7.00	4.31	13.00	4.50	6.30	6.15	4.69	4.00	4.00
June	2.00	1.80	2.17	1.76	2.40	2.80	2.32	2.00	3.25	11.72	7.00	4.56	15.75	4.45	7.25	5.56	4.38	3.80	4.00
July	2.00	2.00	2.15	1.82	2.40	2.70	2.22	2.05	3.25	13.25	7.00	5.00	17.80	4.06	11.00	5.35	4.10	3.75	4.00
August	1.92	1.95	2.15	1.85	2.40	2.90	2.25	2.00	3.30	13.20	7.00	5.25	18.88	3.75	13.90	5.38	4.00	3.88	4.00
September	1.90	2.55	2.12	1.85	2.54	2.90	2.10	2.07	3.31	11.75	7.00	5.80	17.70	4.15	12.50	5.50	4.00	4.25	4.38
October	2.10	2.90	2.10	1.81	3.65	2.81	2.00	2.35	3.88	6.00	7.00	6.25	16.38	4.38	11.70	4.80	4.00	6.31	4.63
November	2.20	3.25	2.05	1.85	4.25	2.60	1.92	2.88	7.10	7.00	7.00	7.00	9.50	4.19	8.38	4.81	4.06	6.81	5.50
December	2.25	3.20	1.97	1.90	4.50	2.50	1.90	2.95	8.63	7.00	7.00	7.00	7.00	3.81	7.88	4.81	4.55	5.20	4.50
Average	*2.14*	*2.27*	*2.30*	*1.89*	*2.84*	*2.98*	*2.25*	*2.19*	*4.19*	*10.03*	*7.00*	*5.47*	*12.27*	*4.63*	*8.00*	*6.27*	*4.42*	*4.61*	*4.96*

THE IRON AGE

Wire Nails, Pittsburgh, & Basic Pig, Valley Furnace

Steel Bars, Pittsburgh, & Southern No. 2 Foundry, Chicago

Steel Tank Plate, Pittsburgh, & Local No. 2 Foundry, Chicago

Bessemer Steel Billets & Heavy Melting Steel Scrap, Pittsburgh

DOLLARS PER GROSS TON

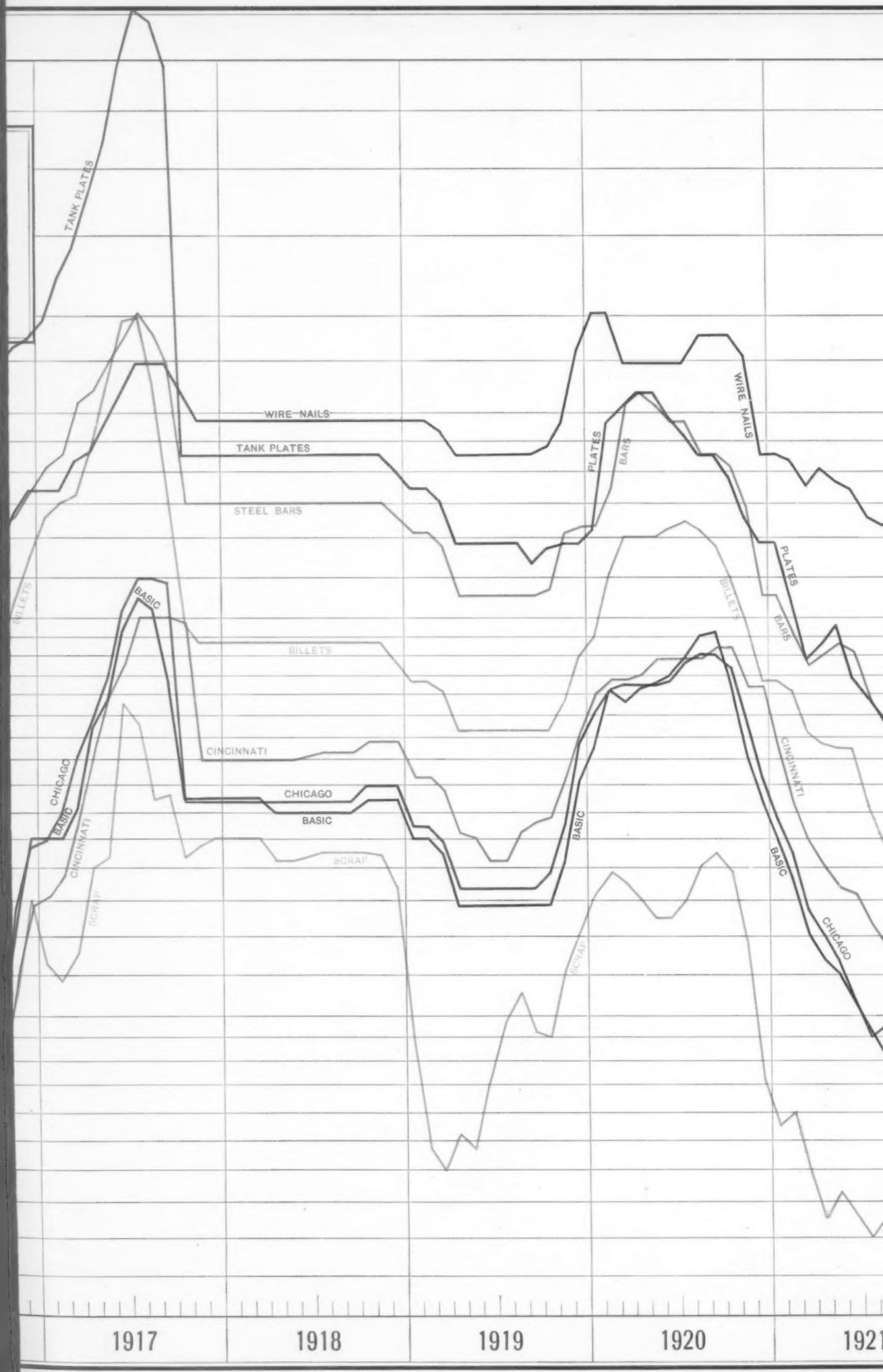
180
140
100
80
70
60
50
40
30
20
18
16
14
12
10

Cents per Pound
—4
—3½
—3
—2¾
—2½
—2¼
—2
—1¾
—1½
—1¼
—1

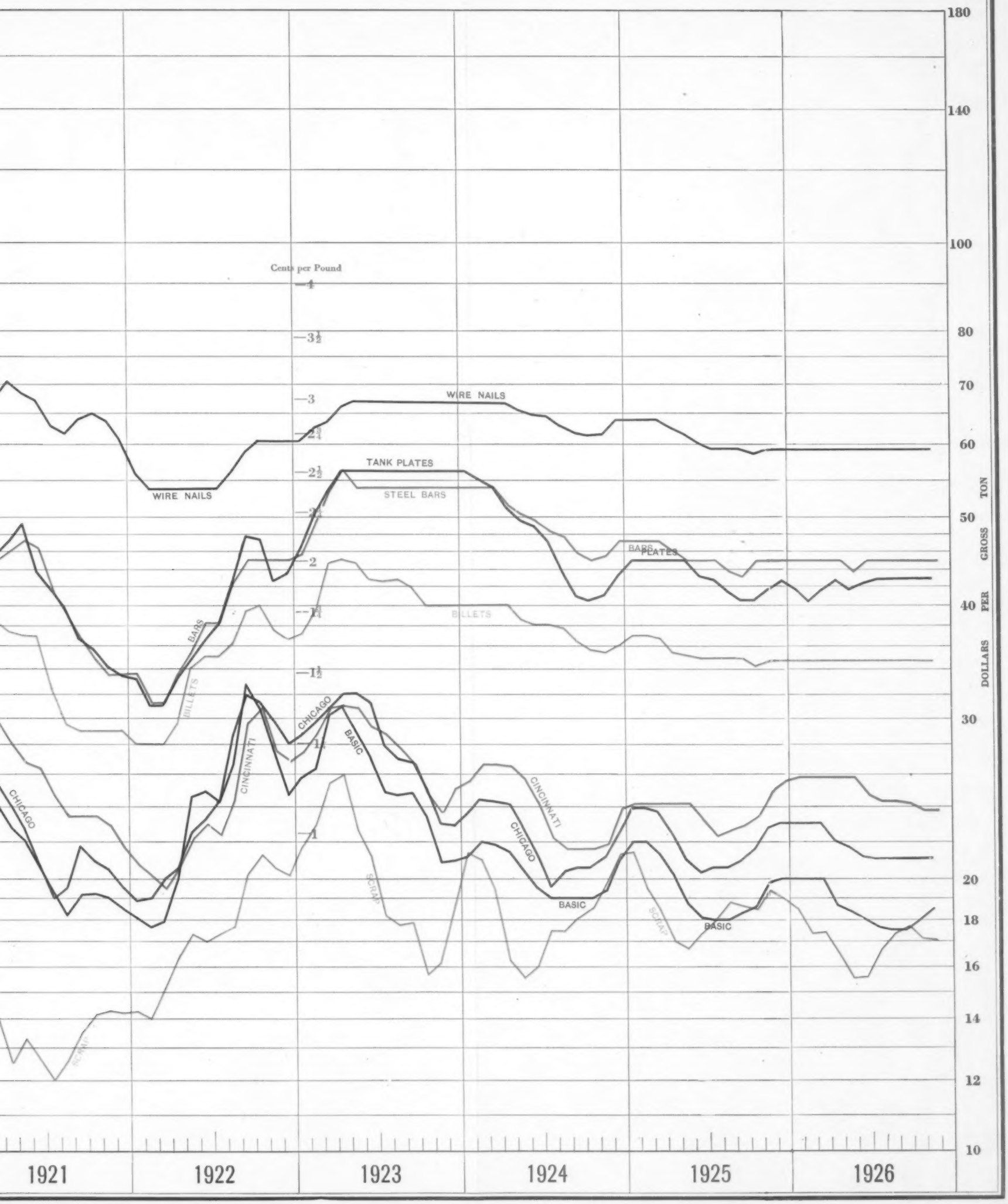
1913 1914 1915 1916 1917 1918

STEEL BARS
WIRE NAILS
TANK PLATES
BILLETS
SCRAP
CHICAGO
BASIC
CINCINNATI

Fourteen Years of Prices of Pig



urteen Years of Prices of Pig Iron, Finished and Semi-Finished Steel



Steel and Heavy Melting Scrap

Heavy Melting Steel Scrap Composite Price

(Average of Pittsburgh, Chicago and Philadelphia Quotations, per Gross Ton)

	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
January	$12.50	$11.77	$14.02	$10.29	$10.27	$16.46	$21.73	$29.93	$17.77	$25.13	$15.04	$12.45	$20.22	$19.15	$20.08	$16.97
February	13.15	11.46	13.06	11.39	10.39	16.10	21.35	29.92	14.75	26.00	15.21	12.46	21.46	19.21	18.27	15.50
March	13.43	11.71	13.10	11.10	10.78	17.28	23.60	29.58	14.52	25.50	13.17	13.46	24.79	17.56	16.92	15.83
April	12.63	12.44	13.39	10.83	10.61	17.42	26.63	28.47	15.79	24.42	11.63	14.71	24.00	15.20	15.43	15.27
May	12.07	12.85	12.30	10.60	10.79	16.47	27.63	28.79	15.06	23.71	12.20	15.67	20.77	14.71	15.46	14.35
June	12.06	12.94	11.60	10.57	10.78	15.25	37.21	28.87	16.54	23.47	11.47	15.52	18.94	14.88	16.09	14.40
July	12.21	12.82	11.42	10.50	11.65	15.19	36.00	29.00	19.13	24.21	11.00	15.92	17.23	16.00	16.46	15.42
August	12.50	13.19	11.46	10.42	13.00	15.35	31.30	29.00	20.25	25.88	11.57	16.30	16.58	16.58	17.23	15.88
September	11.94	13.73	11.35	10.30	13.79	15.67	31.50	29.00	18.87	26.53	12.15	18.33	16.98	17.20	17.39	16.25
October	11.27	14.90	11.00	9.71	13.62	16.90	26.60	29.00	18.67	23.73	12.88	19.20	15.15	17.08	17.08	15.58
November	11.02	14.69	10.39	9.13	14.63	20.40	27.33	28.50	20.00	20.00	12.73	18.02	15.13	18.17	17.63	15.25
December	11.52	14.00	9.97	9.50	16.20	24.13	28.37	25.00	22.77	15.92	12.29	17.94	17.37	20.08	17.39	15.08
Average	*12.19*	*13.04*	*11.92*	*10.36*	*12.21*	*17.22*	*28.35*	*28.76*	*17.89*	*23.71*	*12.61*	*15.83*	*19.05*	*17.15*	*17.12*	*15.48*

Scrap Prices at Pittsburgh, per Gross Ton

Heavy Melting Steel

	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
January	$13.50	$12.75	$14.95	$10.90	$11.63	$17.50	$22.60	$30.00	$19.00	$26.30	$15.50	$14.30	$21.80	$21.38	$21.50	$18.63
February	14.13	12.12	14.19	12.62	11.63	17.06	21.75	30.00	14.75	27.75	16.00	14.00	23.25	20.88	19.50	17.50
March	14.35	12.62	14.19	12.12	12.00	18.45	23.25	30.00	14.00	27.25	14.00	15.13	25.38	19.38	18.50	17.55
April	13.06	13.06	14.19	12.00	11.81	17.81	28.00	28.50	15.20	26.00	12.63	16.38	25.88	16.20	17.00	16.63
May	12.62	13.25	13.55	12.00	11.75	16.95	28.50	28.50	14.75	25.00	13.30	17.30	22.50	15.63	16.75	15.69
June	12.95	13.44	12.62	12.00	11.75	15.88	41.00	28.62	17.12	25.00	12.69	17.00	21.13	16.00	17.30	15.75
July	13.06	13.31	12.40	12.00	12.31	16.31	39.00	29.00	19.70	26.00	12.00	17.38	18.10	17.50	18.00	16.81
August	13.20	13.55	12.37	11.50	13.81	16.05	32.83	29.00	21.00	28.13	12.70	17.75	17.75	17.50	18.88	17.50
September	12.50	14.11	12.25	11.31	14.30	16.19	33.25	29.00	19.20	29.00	13.63	20.13	17.88	18.10	18.70	17.88
October	12.06	15.85	11.85	10.85	14.38	18.25	28.80	29.00	19.00	27.75	14.13	21.40	15.70	18.50	18.50	17.25
November	12.00	15.12	11.44	10.00	15.88	21.20	29.50	28.87	22.25	23.50	14.30	20.50	16.13	19.63	19.50	17.20
December	12.31	14.75	11.08	10.75	17.45	26.00	30.00	26.87	24.25	17.20	14.25	20.13	18.75	21.40	19.10	16.75
Average	*12.98*	*13.66*	*12.92*	*11.50*	*13.23*	*18.14*	*29.90*	*28.95*	*18.35*	*25.74*	*13.76*	*17.62*	*20.38*	*18.51*	*18.60*	*17.10*

No. 1 Cast Cupola Scrap

	1919	1920	1921	1922	1923	1924	1925	1926
Jan.	$24.20	$32.00	$25.00	$16.30	$23.30	$21.00	$19.63	$17.50
Feb.	18.75	34.00	22.75	16.00	24.75	21.38	20.13	17.00
March	18.00	34.00	21.20	15.94	26.75	20.25	18.60	17.00
April	19.00	33.00	18.00	16.88	27.75	18.50	17.75	16.50
May	17.20	32.00	18.00	18.50	26.30	17.88	17.50	16.50
June	18.50	32.00	16.63	18.75	24.13	17.25	17.10	15.90
July	20.40	40.20	16.00	19.00	21.10	17.80	17.00	15.75
Aug.	23.50	41.25	16.20	19.00	21.38	18.00	17.50	16.80
Sept.	23.50	42.00	16.88	22.13	21.75	18.00	17.40	16.50
Oct.	23.80	39.75	17.50	24.00	19.50	18.00	17.39	16.00
Nov.	27.25	34.25	17.10	23.13	18.63	18.13	18.00	16.30
Dec.	28.75	27.25	16.13	22.38	20.00	19.10	17.70	16.00
Aver.	*21.90*	*35.14*	*18.45*	*19.33*	*22.95*	*18.77*	*17.98*	*16.48*

Compressed Sheets

	1919	1920	1921	1922	1923	1924	1925	1926
Jan.	$16.50	$23.00	$13.00	$11.80	$20.50	$18.88	$20.00	$17.63
Feb.	13.25	23.75	13.00	12.00	21.75	19.63	18.00	16.13
March	11.40	23.00	12.00	13.13	23.75	17.50	17.35	15.60
April	13.00	22.13	10.50	14.63	24.75	14.60	16.63	15.25
May	12.75	22.00	10.80	15.10	24.30	13.75	15.46	14.75
June	14.30	22.00	10.13	15.13	19.88	14.38	16.30	14.60
July	15.00	21.50	9.38	15.50	16.90	15.70	16.63	15.50
Aug.	17.88	23.90	10.00	16.10	16.13	16.00	17.39	16.40
Sept.	18.00	24.25	10.06	17.88	16.00	16.55	17.40	16.50
Oct.	18.00	22.75	12.00	19.50	14.30	16.50	17.39	15.63
Nov.	18.00	19.80	12.00	19.50	14.25	17.75	18.00	16.00
Dec.	19.80	14.75	11.69	19.38	16.50	19.40	18.00	15.56
Aver.	*15.66*	*21.90*	*11.22*	*15.80*	*19.08*	*16.72*	*17.27*	*15.80*

Machine Shop Turnings

	1919	1920	1921	1922	1923	1924	1925	1926
Jan.	$11.20	$15.50	$10.00	$9.60	$16.90	$15.75	$17.50	$14.30
Feb.	8.50	17.88	10.00	9.56	18.50	16.13	15.88	13.63
March	9.00	18.00	9.40	10.50	20.38	14.50	14.20	13.35
April	10.12	16.70	8.13	11.88	20.50	12.45	13.39	12.00
May	11.62	15.38	8.70	13.30	19.20	11.88	12.25	11.06
June	9.68	14.75	7.56	13.32	17.19	13.00	13.05	11.00
July	11.60	13.40	7.00	14.00	12.10	13.50	13.63	11.38
Aug.	13.50	15.25	7.85	14.00	11.44	14.13	15.00	12.80
Sept.	12.25	16.30	906	14.75	12.88	14.40	14.75	13.06
Oct.	12.75	15.88	9.56	16.20	11.60	14.25	14.39	12.06
Nov.	14.00	14.63	9.85	16.63	11.63	15.94	15.00	11.90
Dec.	14.25	10.50	8.88	15.63	13.75	17.20	14.30	11.56
Aver.	*11.54*	*15.35*	*8.83*	*13.28*	*15.51*	*14.43*	*14.44*	*12.34*

Cast Iron Borings

	1919	1920	1921	1922	1923	1924	1925	1926
Jan.	$15.00	$18.70	$13.00	$10.90	$18.40	$16.94	$17.50	$14.88
Feb.	10.37	20.25	12.00	11.06	19.50	16.88	15.88	14.13
March	9.75	19.50	11.45	11.94	21.13	15.38	14.10	13.36
April	10.62	18.60	9.38	13.38	21.88	13.00	13.39	12.50
May	10.60	17.38	9.70	14.10	20.20	12.75	12.50	11.75
June	11.19	16.75	8.38	14.63	17.88	14.00	13.05	11.90
July	13.20	18.00	7.63	16.00	15.20	13.80	13.63	12.38
Aug.	15.25	19.63	8.30	15.70	13.88	14.75	15.00	12.75
Sept.	15.38	20.20	9.00	17.00	15.63	14.90	14.75	12.94
Oct.	17.90	19.00	10.13	18.60	13.50	15.00	14.39	12.50
Nov.	17.50	17.38	10.40	17.85	12.75	15.13	15.00	12.90
Dec.	17.75	14.00	9.25	17.50	14.88	16.70	14.90	12.13
Aver.	*13.71*	*18.28*	*9.88*	*14.89*	*17.07*	*14.94*	*14.51*	*12.84*

Low-Phosphorus Scrap, at Pittsburgh; Billet and Bloom Crops; per Gross Ton

	1920	1921	1922	1923	1924	1925	1926
January	$30.80	$24.00	$17.60	$25.30	$23.60	$26.50	$24.00
February	31.75	23.75	17.13	27.50	25.13	24.75	22.25
March	31.00	21.60	17.38	32.00	24.00	23.30	22.00
April	30.25	18.63	18.88	32.25	19.40	22.13	21.13
May	30.00	18.10	20.00	28.60	19.50	21.63	20.00
June	30.00	16.88	20.00	25.88	20.13	22.00	20.00
July	31.25	15.88	20.13	22.00	20.90	22.00	20.75
August	33.40	16.50	21.20	23.50	21.88	22.25	21.00
September	34.25	17.25	24.25	24.38	22.60	23.00	21.67
October	33.00	17.50	25.00	21.90	23.00	23.13	20.50
November	30.00	17.30	24.00	20.50	23.25	24.00	20.60
December	25.25	17.00	24.00	21.75	25.13	24.00	21.13
Average	*30.91*	*18.70*	*20.80*	*25.46*	*22.39*	*23.22*	*21.25*

No. 1 Railroad Cast Scrap at Cincinnati

(Per Net Ton)

	1921	1922	1923	1924	1925	1926
January	$16.25	$12.00	$17.20	$17.25	$17.38	$15.75
February	15.50	11.63	19.50	17.75	15.88	15.00
March	13.90	12.00	21.75	16.25	15.50	14.50
April	13.50	13.25	22.00	14.00	15.13	14.10
May	13.50	14.00	20.60	13.00	15.00	13.50
June	12.75	14.00	18.00	13.38	15.90	13.63
July	11.00	14.00	16.70	14.50	16.00	14.50
August	11.00	14.40	16.25	14.50	15.63	14.75
September	12.00	16.13	16.88	15.30	15.50	15.00
October	12.50	18.00	14.50	14.88	15.00	14.39
November	12.50	17.13	13.66	15.63	15.38	14.00
December	12.00	16.63	15.00	16.38	16.00	14.00
Average	*13.03*	*14.43*	*17.67*	*15.23*	*15.73*	*14.42*

No. 1 Machinery Cast Scrap at Cincinnati

(Per Net Ton)

	1921	1922	1923	1924	1925	1926
January	$17.75	$14.00	$20.39	$20.50	$20.12	$19.75
February	15.50	13.63	21.75	21.50	19.12	19.39
March	13.90	14.05	23.65	20.00	18.35	19.00
April	13.50	15.50	24.75	18.00	17.75	17.80
May	13.50	16.25	24.05	16.75	17.75	17.00
June	13.10	16.25	23.13	17.13	18.15	17.00
July	12.00	16.25	20.25	18.25	18.25	17.00
August	12.00	17.45	19.05	18.25	19.00	17.63
September	12.80	19.88	19.38	18.13	19.25	18.00
October	14.00	21.25	18.00	17.68	19.00	17.39
November	14.00	20.85	16.85	18.40	20.12	17.00
December	14.00	20.75	18.00	18.75	20.00	17.00
Average	*13.84*	*17.17*	*20.69*	*18.69*	*18.91*	*17.83*

Scrap Prices at Chicago, 1911 to 1926

Heavy Melting Steel Scrap, per Gross Ton

	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
January	$11.75	$10.75	$12.60	$9.35	$9.19	$15.50	$21.12	$30.00	$17.40	$24.50	$15.13	$11.45	$19.15	$17.69	$19.44	$15.12
February	12.06	10.75	12.13	10.50	9.56	14.75	21.50	30.25	15.06	25.00	15.13	11.38	20.33	17.88	17.69	13.88
March	12.15	10.94	12.08	9.81	9.63	16.50	23.70	29.87	15.63	24.25	12.50	12.38	23.50	16.56	16.45	13.95
April	11.75	11.56	12.50	9.80	9.15	16.50	27.00	28.75	16.41	23.75	11.00	13.75	22.50	14.10	14.81	13.19
May	10.50	12.05	11.25	9.69	9.37	15.94	28.70	28.80	15.62	23.00	11.50	14.95	19.70	13.75	15.00	12.13
June	10.38	12.12	10.44	9.75	9.44	14.80	36.50	29.00	16.69	22.95	10.81	14.56	17.88	13.63	15.75	12.45
July	10.69	11.69	10.50	9.75	10.40	14.50	33.00	29.00	19.40	24.13	10.00	15.25	17.05	14.90	15.60	14.19
August	11.05	12.25	10.56	9.69	11.56	15.25	29.60	29.00	20.88	25.35	10.60	15.95	16.00	15.50	16.44	14.00
September	10.70	12.81	10.06	9.19	11.75	16.06	31.25	29.00	19.10	24.81	11.31	13.13	16.31	16.40	16.35	14.00
October	10.00	13.95	10.00	8.50	11.75	16.81	26.00	29.00	18.25	21.50	12.44	13.40	14.15	16.13	16.00	13.00
November	9.75	13.69	9.56	8.06	13.44	20.60	27.60	28.50	20.88	18.45	12.25	17.31	14.00	17.13	16.00	13.00
December	10.25	12.88	9.00	8.43	15.63	23.00	28.37	22.75	21.80	16.20	11.13	17.25	16.06	18.95	15.75	13.00
Average	*10.92*	*12.12*	*10.89*	*9.38*	*10.91*	*16.68*	*27.86*	*28.66*	*18.09*	*22.82*	*11.98*	*15.06*	*18.05*	*16.05*	*16.27*	*13.49*

Old Steel Rerolling Rails, per Gross Ton

	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
January	$13.69	$13.00	$16.15	$11.10	$9.62	$17.06	$27.00	$35.00	$22.10	$34.25	$15.63	$12.10	$20.40	$18.88	$21.75	$17.50
February	13.63	12.80	15.50	11.81	9.87	17.06	27.00	35.00	16.44	34.38	15.50	12.00	21.75	20.13	19.25	16.63
March	13.65	12.75	15.00	11.56	10.25	17.65	28.00	34.75	16.38	32.30	13.30	13.31	24.63	19.13	17.86	16.50
April	13.44	12.88	14.63	11.50	10.25	18.00	32.62	33.50	17.55	32.13	12.63	14.50	23.75	16.30	16.00	16.13
May	13.49	13.50	13.95	11.31	10.25	17.38	36.50	34.00	17.75	31.75	13.40	15.70	21.70	15.00	16.88	15.19
June	12.38	13.50	12.69	11.50	10.25	15.85	46.90	34.00	18.75	32.65	12.94	15.25	19.25	14.81	17.85	15.45
July	12.25	13.50	12.25	11.50	10.30	15.25	45.19	34.00	25.15	35.00	12.25	16.13	18.00	15.50	17.44	17.19
August	12.65	14.00	12.12	11.50	12.25	15.80	39.20	34.00	29.50	38.00	12.45	16.90	17.50	16.19	19.00	17.10
September	12.75	15.00	12.25	10.75	13.35	17.06	39.75	34.00	26.80	38.13	13.13	19.38	17.38	17.30	19.25	17.39
October	12.44	16.30	12.15	10.00	13.31	18.81	34.75	34.00	27.19	33.44	14.00	20.30	15.80	17.06	18.88	16.63
November	12.30	16.50	12.00	9.50	14.44	24.50	34.80	33.50	31.25	22.90	13.80	18.38	15.06	18.19	19.44	16.50
December	12.50	16.50	11.33	9.50	16.63	28.63	35.25	27.50	31.90	16.90	12.63	17.75	17.00	20.36	19.10	16.19
Average	*12.93*	*14.19*	*13.34*	*10.96*	*11.73*	*18.59*	*35.58*	*33.60*	*23.40*	*31.90*	*13.47*	*15.98*	*19.35*	*17.40*	*18.56*	*16.53*

No. 1 Railroad Wrought, per Net Ton

	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
January	$11.75	$11.63	$12.70	$8.70	$8.69	$15.88	$23.50	$31.25	$19.10	$26.00	$13.63	$10.50	$17.75	$15.31	$17.44	$13.50
February	12.00	11.30	12.19	9.50	8.87	14.94	23.75	31.25	15.13	27.00	13.50	10.44	18.38	15.38	16.13	12.88
March	12.30	11.44	12.13	9.06	9.00	16.20	25.90	30.75	15.88	27.10	11.60	11.50	20.88	14.06	14.60	12.95
April	11.69	12.31	12.38	9.00	8.65	17.00	30.35	30.20	16.05	27.25	10.00	12.13	20.00	12.75	13.00	12.44
May	11.38	12.75	11.25	9.00	8.94	16.50	32.60	29.75	15.69	26.38	10.40	12.90	17.60	12.00	13.44	10.94
June	11.25	12.57	10.56	9.00	9.00	15.20	41.00	29.75	16.87	25.25	9.63	12.69	15.50	11.56	14.65	11.60
July	11.00	12.06	10.55	9.00	9.15	14.94	37.75	29.75	18.60	24.88	9.25	13.63	14.60	12.80	14.19	13.31
August	11.10	12.50	10.62	8.94	10.44	15.30	33.70	29.75	20.75	24.75	10.45	14.75	14.25	13.75	16.00	13.50
September	10.94	13.13	10.19	8.37	11.00	16.38	35.50	29.75	19.50	23.88	11.50	17.62	15.63	14.80	15.50	13.50
October	10.44	14.25	9.60	7.87	11.19	17.50	28.75	30.36	19.38	20.25	13.00	17.75	13.20	14.25	14.38	12.81
November	10.20	13.50	9.00	7.56	12.94	21.00	30.90	28.68	22.88	16.85	12.20	15.81	12.50	15.50	15.63	12.50
December	10.75	13.06	8.50	7.90	15.38	25.13	31.25	24.62	24.10	14.60	10.44	15.13	15.00	16.81	13.95	12.00
Average	*11.23*	*12.54*	*10.81*	*8.66*	*10.27*	*17.16*	*31.25*	*29.66*	*18.66*	*23.68*	*11.30*	*13.74*	*16.27*	*14.08*	*14.91*	*12.66*

No. 1 Machinery Cast Scrap, per Net Ton

	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
January	$12.19	$11.25	$12.90	$10.20	$9.19	$13.31	$15.50	$25.90	$22.95	$37.25	$17.25	$12.90	$21.60	$20.38	$19.88	$17.00
February	12.13	11.25	12.69	10.87	9.00	12.81	15.37	26.06	20.00	38.88	18.00	13.25	23.63	21.00	18.75	17.00
March	12.25	11.31	12.50	10.37	9.00	13.45	16.90	27.25	21.63	37.85	14.90	14.13	26.25	20.13	18.20	17.00
April	11.81	12.06	12.44	10.25	9.00	12.88	20.43	27.12	21.45	37.25	13.25	14.88	25.75	18.40	17.25	16.39
May	11.00	12.20	11.60	10.06	9.00	12.56	23.20	26.70	20.12	37.38	13.60	16.20	23.30	17.38	16.88	15.88
June	10.75	11.81	10.63	9.75	9.00	11.75	30.00	27.12	20.75	36.30	12.75	16.06	21.75	16.75	17.50	16.15
July	10.50	11.75	10.70	9.65	9.25	11.50	29.25	28.06	23.30	36.50	12.25	17.00	19.60	16.90	17.50	17.19
August	10.55	12.15	10.87	9.50	9.62	11.50	24.20	29.10	24.50	36.20	12.60	18.60	18.00	17.50	17.63	17.00
September	10.10	12.81	10.62	9.19	10.10	12.13	23.75	30.00	24.20	34.00	13.44	21.38	19.63	18.20	17.90	16.88
October	10.25	14.20	10.40	9.00	10.50	13.50	20.50	30.36	25.00	28.75	13.88	20.80	18.70	17.50	17.63	16.50
November	10.35	13.50	10.06	8.56	12.13	15.55	22.00	28.87	28.12	23.00	13.50	20.25	18.38	17.88	18.19	16.00
December	11.00	13.25	9.83	9.00	13.75	16.25	23.50	25.75	32.35	18.70	12.63	19.75	19.75	19.20	17.25	16.13
Average	*11.07*	*12.30*	*11.27*	*9.70*	*9.96*	*13.10*	*22.05*	*27.69*	*23.70*	*33.51*	*14.00*	*17.10*	*21.36*	*18.44*	*17.88*	*16.59*

Cast Borings, per Gross Ton

	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
January	$10.08	$18.48	$12.54	$16.11	$10.92	$6.38	$15.57	$13.58	$15.56	$13.39
February	10.15	18.48	8.75	16.39	11.76	6.93	16.59	15.55	14.63	12.06
March	10.64	18.48	10.15	15.74	8.40	8.05	18.91	14.38	13.85	11.75
April	11.83	17.99	10.47	15.96	7.28	9.24	17.92	11.40	10.94	10.94
May	13.44	17.53	9.31	14.43	6.61	10.98	16.24	10.00	10.00	9.75
June	19.60	17.77	9.33	13.38	5.60	11.63	14.43	10.06	10.70	9.95
July	20.01	18.48	12.71	14.15	5.32	12.67	13.66	10.45	11.13	11.19
August	18.36	18.48	14.28	15.06	5.38	12.88	12.04	10.69	12.75	11.45
September	18.20	18.48	13.55	14.65	5.60	14.43	12.19	11.80	13.15	11.19
October	15.75	18.48	11.63	12.88	6.44	14.90	10.42	11.56	12.75	8.88
November	17.25	16.80	12.88	11.93	6.83	14.56	10.08	12.63	13.19	9.20
December	18.05	14.84	14.17	10.98	6.09	14.56	12.04	14.36	13.50	9.50
Average	*15.28*	*17.94*	*11.65*	*14.30*	*7.19*	*11.43*	*14.17*	*12.21*	*12.68*	*10.77*

Steel Knuckles and Couplers, per Gross Ton

	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
January	$25.20	$37.52	$24.51	$27.44	$16.39	$12.77	$24.98	$21.21	$22.88	$18.00
February	25.20	36.59	19.32	29.68	16.11	12.39	26.53	21.77	21.00	17.13
March	26.60	35.00	19.60	27.66	13.55	14.12	28.71	20.00	18.70	16.70
April	30.67	34.00	19.21	26.32	12.47	15.68	27.93	17.40	17.63	16.44
May	33.71	34.00	17.36	25.48	13.66	16.69	25.42	17.00	17.63	15.39
June	43.83	34.00	18.20	25.20	13.16	15.89	22.55	16.63	19.00	15.30
July	45.92	34.00	20.50	27.16	11.63	17.92	21.00	17.20	18.19	17.39
August	44.24	34.00	23.52	29.01	12.21	19.21	20.87	18.00	19.50	17.50
September	40.88	34.00	21.95	27.72	13.03	21.84	21.56	19.35	19.50	17.39
October	33.38	34.00	21.43	24.51	14.84	22.96	18.93	18.25	18.63	16.06
November	33.04	34.00	23.39	20.83	14.28	21.84	17.64	19.63	18.75	15.50
December	35.67	32.55	24.86	16.95	12.60	22.12	19.88	22.78	18.25	15.50
Average	*34.86*	*34.50*	*21.15*	*25.67*	*13.66*	*17.79*	*23.00*	*19.10*	*19.14*	*16.53*

Railroad Malleable Scrap at Chicago, per Gross Ton

	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
January	$12.25	$12.19	$15.01	$10.36	$9.11	$15.47	$19.88	$30.02	$19.71	$32.48	$16.52	$12.77	$25.26	$20.93	$21.13	$18.00
February	11.76	11.54	14.56	11.63	8.96	14.93	19.39	30.02	16.65	33.53	17.36	12.81	26.75	21.77	20.00	17.56
March	12.32	11.69	14.56	10.71	8.89	15.62	20.10	31.24	18.07	31.92	15.46	13.87	28.56	21.00	19.10	17.60
April	12.32	12.53	14.77	10.25	8.96	15.56	22.81	31.64	17.70	30.95	13.59	15.68	28.00	19.30	17.50	17.39
May	11.63	12.94	13.55	10.24	9.12	15.05	26.10	32.82	17.08	29.68	14.11	16.80	25.54	18.13	17.63	16.50
June	11.31	13.16	12.39	10.08	9.11	13.14	35.41	33.04	17.92	28.73	12.88	16.73	24.08	16.88	18.00	16.60
July	11.20	13.16	11.87	10.08	9.97	13.03	33.73	33.28	20.94	30.24	12.53	17.51	22.51	17.00	17.88	17.81
August	11.26	13.50	11.63	9.95	11.20	12.60	33.26	34.01	22.96	32.20	13.44	19.04	20.59	17.38	19.13	17.75
September	11.20	14.07	11.41	9.24	11.48	12.88	34.44	34.01	21.22	30.95	14.63	23.67	21.71	18.20	19.10	17.39
October	10.85	15.40	10.81	8.85	11.48	13.87	28.28	34.01	21.35	26.32	15.12	24.42	19.60	18.13	18.50	16.50
November	10.64	15.19	10.43	8.68	12.75	17.92	28.67	32.68	25.89	21.78	14.67	23.11	18.91	19.00	19.19	16.50
December	11.27	15.12	10.08	8.90	15.40	20.16	30.63	25.48	28.78	16.80	12.81	22.40	20.23	20.28	18.30	16.00
Average	*11.50*	*13.37*	*12.59*	*9.91*	*10.53*	*15.02*	*27.72*	*31.85*	*20.85*	*28.80*	*14.43*	*18.23*	*23.48*	*19.00*	*18.79*	*17.13*

Old Cast Iron Carwheels at Chicago, per Gross Ton

	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
January	$13.00	$13.25	$16.95	$11.65	$9.94	$14.63	$18.87	$30.00	$25.90	$36.13	$21.00	$15.30	$26.70	$20.50	$21.38	$18.00
February	13.00	13.05	16.75	12.44	10.00	13.94	18.25	30.00	22.75	38.06	20.63	15.00	27.25	21.00	19.38	17.13
March	13.25	13.00	16.75	11.88	9.94	14.30	20.25	30.00	21.50	36.20	15.90	16.50	28.38	21.00	17.10	17.00
April	13.25	13.25	16.75	11.55	9.75	13.88	23.62	29.00	21.50	37.50	14.06	18.63	27.75	16.70	16.00	16.39
May	12.75	13.90	15.05	11.50	9.75	12.95	27.35	29.00	21.25	37.50	14.70	18.50	24.10	16.25	16.06	15.25
June	12.55	14.13	13.94	11.50	10.19	12.44	39.00	29.00	22.00	35.90	13.31	18.25	21.88	15.63	17.30	15.30
July	12.50	13.88	12.90	11.25	11.30	12.50	35.25	29.00	23.95	35.75	12.75	19.25	20.60	16.40	17.12	16.39
August	12.85	13.70	12.75	11.25	11.04	11.60	30.40	29.00	26.25	38.35	12.95	20.60	19.50	17.13	17.50	15.90
September	12.81	14.38	12.63	11.06	11.80	11.69	31.87	29.00	24.90	37.69	14.19	23.75	19.75	18.20	17.70	15.25
October	12.50	16.00	12.10	10.65	12.00	12.94	25.75	29.00	24.88	36.06	16.50	25.10	17.90	17.63	17.38	14.50
November	12.10	16.69	12.00	9.81	13.31	17.30	28.15	29.00	28.63	31.95	16.60	24.63	17.88	18.63	18.31	14.50
December	13.06	16.75	11.88	9.60	14.56	21.25	31.00	26.75	31.10	24.40	15.75	24.00	19.75	20.70	18.30	14.50
Average	*12.80*	*14.33*	*14.20*	*11.18*	*11.13*	*14.12*	*27.48*	*29.06*	*24.55*	*35.46*	*15.70*	*19.96*	*22.62*	*18.31*	*17.79*	*15.84*

Philadelphia Scrap Prices, 1911 to 1926, Delivered Eastern Pennsylvania

Heavy Melting Steel Scrap, per Gross Ton

	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
January	$12.50	$12.19	$14.40	$10.40	$10.00	$16.38	$21.70	$30.00	$17.20	$24.75	$14.50	$11.60	$19.70	$18.20	$18.50	$17.00
February	13.50	11.70	12.87	11.00	10.00	16.50	20.63	30.00	14.75	25.62	14.25	12.00	20.75	18.38	17.63	15.88
March	14.05	11.80	13.25	11.31	10.80	16.90	23.50	29.00	14.19	25.20	13.00	12.78	25.25	16.75	15.90	16.00
April	13.31	12.94	13.34	10.95	11.00	17.88	24.88	28.00	15.50	24.12	11.25	14.00	23.63	15.30	14.63	16.00
May	13.00	13.50	12.10	10.63	11.25	16.60	25.40	29.00	15.00	23.37	11.80	14.75	19.80	14.75	14.63	15.25
June	13.00	13.50	11.75	10.50	11.10	15.31	34.13	29.00	16.12	22.60	11.25	15.00	17.88	15.00	15.10	14.70
July	13.19	13.50	11.35	10.30	12.06	14.94	35.20	29.00	18.90	22.62	11.00	15.00	16.60	15.40	15.63	14.63
August	13.15	13.65	11.43	10.19	13.75	14.75	31.88	29.00	19.37	25.00	11.40	15.20	16.00	16.75	16.38	16.20
September	12.50	14.50	11.62	10.69	15.00	14.75	30.25	29.00	18.62	25.62	11.50	16.88	16.75	17.10	17.20	16.88
October	11.94	15.10	11.15	9.95	14.75	15.63	25.00	29.00	19.10	22.75	12.06	17.80	15.40	16.63	16.75	16.50
November	11.55	15.50	10.19	9.25	14.65	20.13	26.00	28.00	20.62	19.00	11.88	16.25	15.25	17.75	17.38	15.50
December	12.08	15.25	10.00	9.40	15.81	23.75	28.20	25.00	22.50	15.25	11.50	16.38	16.75	20.10	17.50	15.50
Average	*12.81*	*13.69*	*11.96*	*10.38*	*12.51*	*16.96*	*27.23*	*28.67*	*17.66*	*22.99*	*12.12*	*14.80*	*18.65*	*16.84*	*16.44*	*15.84*

No. 1 Machinery Cast Scrap, per Gross Ton

	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
January	$14.00	$13.42	$14.50	$12.00	$12.00	$17.00	$20.20	$30.00	$23.80	$36.00	$23.25	$16.50	$23.20	$20.70	$20.13	$18.39
February	14.38	13.00	14.37	12.88	12.00	17.00	20.00	30.00	23.00	40.00	23.00	16.50	24.25	20.25	18.88	17.75
March	14.40	13.12	14.00	13.00	12.00	17.00	21.75	30.00	21.25	39.20	19.40	17.13	28.25	18.63	18.00	17.50
April	13.44	13.62	13.94	13.00	11.75	17.88	26.63	29.00	22.00	38.00	18.00	17.25	26.25	17.70	17.25	17.50
May	13.13	13.75	13.60	12.25	12.13	17.50	29.00	29.00	21.50	37.75	18.00	18.40	24.30	17.00	17.00	17.25
June	13.00	13.75	13.25	12.00	12.25	16.50	33.50	29.00	22.00	37.00	17.38	19.00	22.25	17.50	17.50	17.00
July	13.06	13.75	13.00	12.00	12.38	16.00	36.30	29.00	22.10	37.50	16.50	17.50	20.40	17.50	17.63	17.00
August	13.20	13.75	12.87	12.00	13.30	16.00	33.25	29.00	24.75	39.00	17.00	18.50	20.38	17.88	18.00	17.70
September	12.69	14.96	12.81	12.00	14.00	16.00	31.00	29.00	25.00	39.25	17.00	21.50	21.38	18.00	18.00	18.00
October	12.44	14.50	13.50	11.40	14.00	16.15	28.00	29.00	25.20	38.75	17.13	22.60	19.50	17.50	18.00	17.39
November	12.25	14.75	12.62	11.00	14.50	18.50	30.00	29.00	27.62	33.80	17.50	21.00	19.25	17.88	18.00	17.30
December	13.00	15.00	12.17	11.30	16.06	20.75	30.60	29.00	30.75	24.50	16.63	20.25	20.25	19.50	18.13	17.00
Average	*13.25*	*13.95*	*13.39*	*12.07*	*13.03*	*17.19*	*28.35*	*29.25*	*24.08*	*36.73*	*18.49*	*18.85*	*22.47*	*18.34*	*18.04*	*17.48*

No. 1 Railroad Wrought, per Gross Ton

	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
January	$15.63	$15.37	$16.10	$13.05	$12.00	$22.00	$26.60	$35.00	$24.20	$33.50	$20.00	$14.50	$22.10	$20.90	$20.88	$18.39
February	16.06	14.00	15.12	14.38	12.00	21.63	25.50	35.00	21.50	36.00	19.75	14.63	24.75	21.50	20.13	17.75
March	17.20	14.12	15.25	14.00	12.50	22.13	30.75	35.00	20.25	35.90	17.20	15.38	27.50	19.00	18.90	17.20
April	16.06	15.44	15.37	13.25	12.69	23.38	36.00	35.00	21.60	35.00	17.00	15.88	27.00	18.10	17.75	17.50
May	15.25	15.75	15.00	12.63	12.94	22.50	41.40	34.00	21.00	33.50	15.20	16.90	24.20	16.63	17.50	17.25
June	15.00	15.44	14.75	12.50	13.00	20.50	51.25	34.00	21.50	33.00	14.38	17.00	22.50	16.50	18.10	16.60
July	15.13	15.50	13.90	12.20	13.44	19.50	50.60	34.00	24.40	33.00	13.50	17.13	18.80	17.70	17.63	16.50
August	15.70	15.80	14.00	12.00	14.95	20.20	45.00	34.00	26.50	33.00	14.00	18.00	18.00	18.63	17.50	17.80
September	14.75	16.31	14.68	12.38	16.50	20.00	44.00	34.00	26.50	33.25	15.00	20.88	18.50	19.00	17.70	17.88
October	13.94	16.80	14.00	11.80	16.13	21.63	37.20	34.00	26.90	29.25	15.88	22.20	17.50	18.00	18.13	17.00
November	13.85	17.06	13.00	11.50	16.50	24.13	35.00	34.00	28.37	25.00	16.00	19.00	17.38	18.38	18.50	17.00
December	15.00	16.25	12.75	11.50	20.06	26.75	35.00	33.00	30.25	20.00	14.63	19.25	18.50	20.40	18.50	17.00
Average	*15.30*	*15.65*	*14.49*	*12.60*	*14.39*	*22.03*	*38.19*	*34.25*	*24.41*	*31.70*	*16.04*	*17.56*	*21.39*	*18.73*	*18.44*	*17.32*

Old Cast Iron Carwheels, per Gross Ton

	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
January	$13.00	$12.37	$16.20	$12.20	$11.00	$16.38	$21.50	$30.00	$24.60	$36.00	$25.00	$16.50	$22.30	$20.10	$19.50	$18.13
February	13.44	12.00	15.37	12.63	10.63	16.50	20.50	30.00	23.00	40.62	24.00	15.00	24.75	20.38	18.38	17.50
March	14.00	11.94	15.00	12.50	11.00	16.70	21.50	30.00	23.00	42.40	18.50	15.94	26.50	18.75	18.50	17.50
April	13.19	12.87	14.87	12.00	11.00	17.38	25.75	29.00	23.10	40.00	18.00	15.88	26.50	17.50	17.75	17.50
May	13.00	13.90	13.75	11.75	11.38	16.70	28.00	29.00	21.00	40.00	16.80	16.70	24.20	17.00	17.00	17.25
June	13.10	14.00	13.12	11.19	11.55	16.38	34.00	29.00	22.00	38.00	18.00	17.13	22.75	17.00	17.00	17.00
July	12.94	14.00	12.30	11.00	12.38	15.63	36.20	29.00	23.20	38.50	16.50	17.50	20.40	17.30	17.25	17.00
August	13.00	14.05	12.37	11.25	13.25	15.50	34.50	29.00	24.50	40.60	16.40	18.10	20.25	17.75	18.50	17.40
September	12.56	14.25	12.75	11.25	14.00	15.50	32.50	29.00	24.50	42.75	17.00	21.75	21.00	18.00	18.50	17.50
October	11.75	14.87	12.46	10.10	13.75	15.88	29.00	29.00	24.50	40.50	17.00	22.50	19.60	17.50	18.50	17.13
November	11.35	15.00	12.00	9.50	14.05	18.88	31.25	29.00	27.75	36.40	17.20	20.50	17.75	17.88	18.50	16.60
December	12.33	15.50	12.00	10.00	15.63	22.38	32.40	28.00	30.50	26.00	16.63	20.00	19.50	19.20	18.50	16.50
Average	*12.81*	*13.73*	*13.52*	*11.28*	*12.47*	*16.98*	*28.93*	*29.17*	*24.30*	*38.48*	*18.42*	*18.13*	*22.18*	*18.20*	*18.16*	*17.22*

Metals, Tin Plate and Galvanized Sheets for Sixteen Years

Lake Copper at New York, Cents per Pound (1920 to 1926 Prices are Electrolytic Copper)

	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
January	12.81	14.50	16.98	14.85	14.02	24.39	29.73	23.50	20.48	19.27	12.95	13.55	14.52	12.46	14.73	13.84
February	12.75	14.41	15.55	15.00	15.21	26.85	34.90	23.50	17.86	19.02	12.84	12.92	15.34	12.73	14.49	14.00
March	12.58	14.88	15.05	14.79	15.75	27.10	35.85	23.50	15.46	18.50	12.19	12.68	16.84	13.52	14.06	13.86
April	12.41	16.00	15.67	14.75	18.90	28.27	31.67	23.50	15.55	19.19	12.49	12.61	16.81	13.21	13.30	13.69
May	12.33	16.30	15.91	14.40	21.00	28.88	31.42	23.50	16.18	19.05	12.79	13.13	15.54	12.76	13.34	13.60
June	12.71	17.53	15.42	14.12	23.38	27.82	32.46	23.50	17.95	19.00	12.88	13.62	14.74	12.35	13.41	13.64
July	12.78	17.54	14.78	13.70	21.98	25.84	28.78	25.80	22.07	19.00	12.46	13.71	14.39	12.39	13.95	13.91
August	12.75	17.73	15.86	12.85	19.33	26.95	27.24	26.00	23.16	19.00	11.70	13.74	13.87	13.26	14.48	14.19
September	12.65	17.77	16.77	12.66	17.97	28.03	24.90	26.00	22.68	18.70	12.01	13.75	13.36	12.97	14.42	14.05
October	12.53	17.80	16.85	11.73	17.89	28.48	23.50	26.00	22.13	16.56	12.67	13.66	12.58	12.96	14.29	13.88
November	12.80	17.70	16.16	12.00	18.92	32.32	23.50	26.00	20.69	14.63	13.07	13.62	12.76	13.59	14.36	13.59
December	13.84	17.69	14.88	13.35	20.24	33.38	23.50	25.40	18.90	13.63	13.55	14.00	12.88	14.23	13.82	13.31
Average	*12.75*	*16.65*	*15.82*	*13.68*	*18.72*	*28.19*	*28.95*	*24.68*	*19.43*	*17.96*	*12.63*	*13.42*	*14.47*	*13.04*	*14.05*	*13.80*

Spelter (Zinc) at New York, Cents per Pound

	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
January	5.56	6.52	7.15	5.29	6.59	18.19	9.94	7.88	7.38	9.62	5.83	5.06	7.28	6.78	8.10	8.75
February	5.56	6.71	6.45	5.40	8.84	20.13	10.48	7.99	6.70	9.14	5.36	4.85	7.58	7.11	7.86	8.16
March	5.65	6.98	6.26	5.28	9.29	18.40	10.77	7.64	6.52	8.93	5.20	5.00	8.19	6.85	7.68	7.69
April	5.51	6.86	5.77	5.18	11.22	18.58	9.85	7.01	6.51	8.63	5.24	5.25	7.65	6.49	7.35	7.36
May	5.50	6.86	5.47	5.06	16.14	15.86	9.46	7.32	6.46	8.08	5.28	5.45	6.99	6.13	7.30	7.16
June	5.63	6.99	5.18	5.09	22.18	12.75	9.62	8.01	6.93	7.92	4.95	5.69	6.40	6.14	7.35	7.47
July	5.79	7.26	5.38	5.02	20.58	9.83	8.95	8.69	7.90	8.18	4.77	6.12	6.43	6.25	7.60	7.76
August	6.04	7.19	5.75	5.60	14.11	8.98	8.69	8.96	7.84	8.31	4.69	6.59	6.68	6.53	7.55	7.69
September	6.03	7.53	5.82	5.50	14.16	8.22	8.34	9.60	7.57	7.82	4.74	6.91	6.81	6.54	8.12	7.76
October	6.20	7.57	5.42	4.97	13.96	9.98	8.24	9.11	7.83	7.51	5.10	7.20	6.66	6.67	8.65	7.66
November	6.60	7.48	5.29	5.12	17.15	11.90	7.95	8.70	8.14	6.84	5.18	7.48	6.70	7.14	9.04	7.56
December	6.44	7.33	5.18	5.71	16.69	11.13	7.84	8.45	8.59	6.00	5.25	7.46	6.60	7.73	8.97	7.39
Average	*5.88*	*7.11*	*5.76*	*5.27*	*14.24*	*13.66*	*9.18*	*8.28*	*7.36*	*8.08*	*5.13*	*6.09*	*7.00*	*6.70*	*7.96*	*7.70*

Lead, at New York, Cents per Pound

	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
January	4.50	4.41	4.35	4.11	3.74	5.93	7.69	6.87	5.56	8.67	5.00	4.70	7.85	8.31	10.26	9.25
February	4.46	4.00	4.35	4.06	3.82	6.23	9.13	7.04	5.05	8.88	4.54	4.70	8.14	9.01	9.38	9.08
March	4.41	4.08	4.35	3.97	4.04	7.43	9.47	7.34	5.23	9.21	4.08	4.71	8.47	9.23	8.90	8.46
April	4.44	4.20	4.40	3.82	4.20	7.73	9.43	6.95	5.03	8.95	4.33	5.13	8.19	8.19	8.01	7.91
May	4.40	4.20	4.37	3.90	4.25	7.45	11.00	6.88	5.05	8.55	4.99	5.51	7.39	7.27	8.08	7.75
June	4.46	4.50	4.35	3.90	5.89	6.87	11.68	7.55	5.34	8.48	4.56	5.73	7.14	7.08	8.35	8.08
July	4.50	4.67	4.37	3.90	5.59	6.34	10.72	8.04	5.65	8.67	4.40	5.75	6.28	7.15	8.33	8.60
August	4.50	4.54	4.64	3.87	4.68	6.26	10.72	8.05	5.77	8.98	4.40	5.88	6.74	8.02	9.52	8.96
September	4.49	5.04	4.73	3.86	4.62	6.88	8.84	8.05	6.12	8.11	4.60	6.20	7.06	8.09	9.60	8.80
October	4.31	5.06	4.52	3.52	4.60	7.00	6.77	8.05	6.45	7.24	4.70	6.67	6.84	8.31	9.62	8.40
November	4.31	4.66	4.33	3.68	5.16	7.13	6.44	8.05	6.76	6.33	4.70	7.20	6.87	8.96	9.84	8.00
December	4.45	4.32	4.06	3.80	5.33	7.60	6.48	6.71	7.03	4.80	4.70	7.28	7.61	9.61	9.36	7.87
Average	*4.44*	*4.47*	*4.40*	*3.87*	*4.66*	*6.90*	*9.03*	*7.46*	*5.76*	*8.07*	*4.58*	*5.79*	*7.39*	*8.27*	*9.10*	*8.39*

Straits Tin, at New York, Cents per Pound

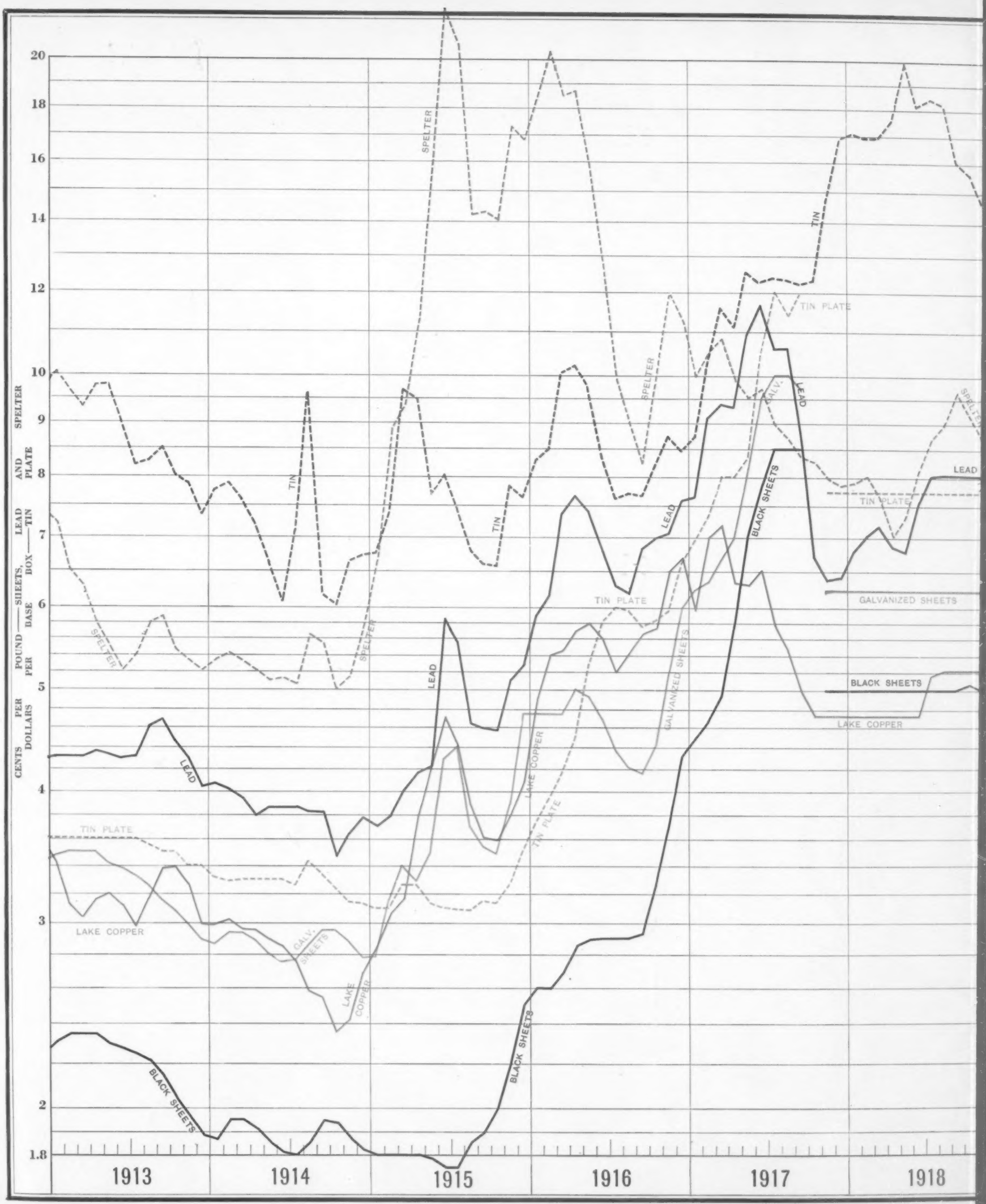
	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
January	41.20	44.58	50.34	39.12	34.13	41.76	44.10	85.13	71.50	62.74	35.94	32.03	39.16	48.70	58.26	62.20
February	43.34	43.56	48.71	39.82	37.25	42.60	51.47	85.00	72.45	59.87	32.16	30.74	41.98	53.41	57.09	63.65
March	41.10	42.76	46.93	38.03	48.73	50.53	58.38	85.00	72.50	61.93	28.79	29.14	48.61	55.03	53.67	64.47
April	42.05	43.64	49.04	36.10	47.64	51.51	55.82	88.53	72.50	62.12	30.36	30.58	45.84	50.02	52.27	63.35
May	43.32	45.98	49.06	33.21	38.79	49.14	63.21	100.00	72.50	54.99	32.50	30.92	43.11	44.08	54.65	62.36
June	46.25	47.44	45.01	30.60	40.26	42.07	61.93	91.00	71.83	48.34	29.39	31.46	40.97	42.74	55.93	60.63
July	43.23	44.70	41.32	35.65	37.38	38.25	62.61	93.00	70.11	49.29	27.69	31.67	38.47	46.29	58.05	62.98
August	43.38	45.86	41.63	48.34	34.37	38.88	62.53	91.33	62.20	47.60	26.35	32.36	39.33	51.89	58.12	65.17
September	39.69	49.16	42.63	31.13	33.13	38.65	61.54	80.40	59.79	44.43	26.70	32.36	41.60	49.24	58.27	68.89
October	41.23	50.07	40.38	30.25	33.05	41.10	62.24	78.82	54.82	40.47	27.70	34.61	41.80	50.60	62.24	70.36
November	43.08	49.87	39.75	33.28	39.50	44.12	74.18	73.67	54.17	36.97	28.93	36.76	44.09	54.25	63.30	70.75
December	45.03	49.86	37.12	34.01	38.53	42.55	84.74	71.51	53.80	34.04	32.41	37.48	47.16	56.03	62.94	68.68
Average	*42.74*	*46.46*	*44.38*	*35.80*	*38.56*	*43.43*	*61.90*	*85.28*	*66.68*	*50.23*	*29.91*	*32.51*	*42.68*	*50.19*	*57.90*	*64.29*

Tin Plate, at Pittsburgh, Dollars per Base Box

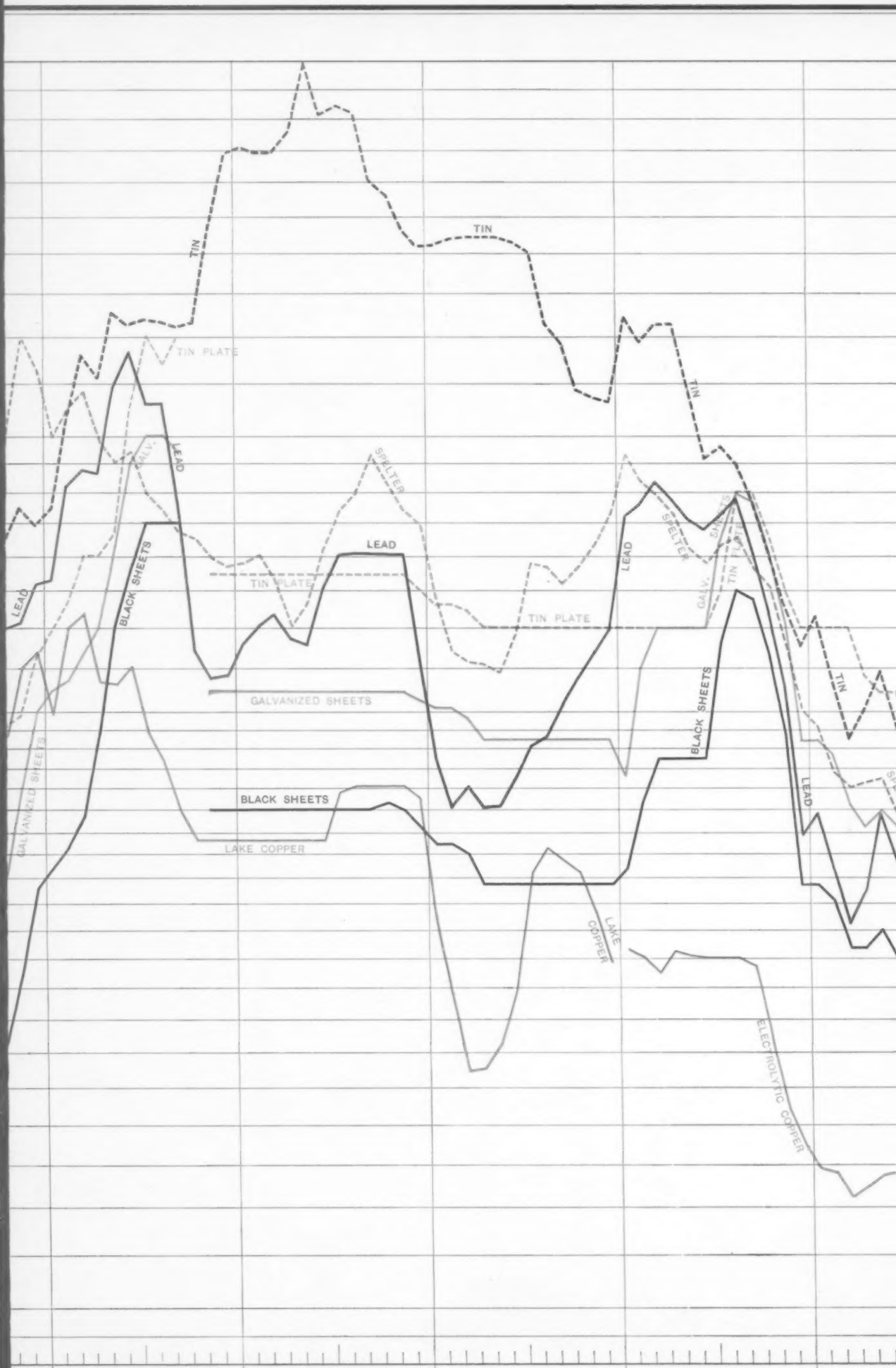
	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
January	$3.60	$3.40	$3.60	$3.32	$3.10	$3.75	$7.00	$7.75	$7.35	$7.00	$7.00	$4.75	$4.75	$5.50	$5.50	$5.50
February	3.67	3.35	3.60	3.29	3.10	3.96	7.38	7.75	7.35	7.00	7.00	4.71	4.80	5.50	5.50	5.50
March	3.70	3.30	3.60	3.30	3.25	4.19	8.00	7.75	7.26	7.00	7.00	4.60	5.23	5.50	5.50	5.50
April	3.70	3.30	3.60	3.30	3.25	4.50	8.00	7.75	7.00	7.00	6.44	4.75	6.00	5.50	5.50	5.50
May	3.70	3.33	3.60	3.30	3.15	5.30	8.40	7.75	7.00	7.00	6.25	4.75	5.70	5.50	5.50	5.50
June	3.70	3.40	3.60	3.30	3.11	5.81	10.50	7.75	7.00	7.00	6.25	4.75	5.50	5.50	5.50	5.50
July	3.70	3.43	3.60	3.27	3.10	6.00	12.00	7.75	7.00	7.50	5.69	4.75	5.50	5.50	5.50	5.50
August	3.70	3.50	3.55	3.41	3.10	5.95	11.40	7.75	7.00	9.00	5.25	4.75	5.50	5.50	5.50	5.50
September	3.67	3.58	3.50	3.35	3.15	5.75	12.00	7.75	7.00	9.00	5.25	4.75	5.50	5.50	5.50	5.50
October	3.52	3.60	3.50	3.24	3.15	5.81	....	7.75	7.00	8.33	5.13	4.75	5.50	5.50	5.50	5.50
November	3.40	3.60	3.40	3.15	3.28	5.97	7.75	7.75	7.00	7.50	4.75	4.75	5.50	5.50	5.50	5.50
December	3.40	3.60	3.40	3.13	3.52	6.63	7.75	7.55	7.00	7.00	4.73	4.75	5.50	5.50	5.50	5.50
Average	*3.62*	*3.45*	*3.55*	*3.28*	*3.19*	*5.30*	*9.11*	*7.73*	*7.08*	*7.53*	*5.90*	*4.73*	*5.42*	*5.50*	*5.50*	*5.50*

No. 28 Galvanized Sheets, at Pittsburgh, Cents per Pound

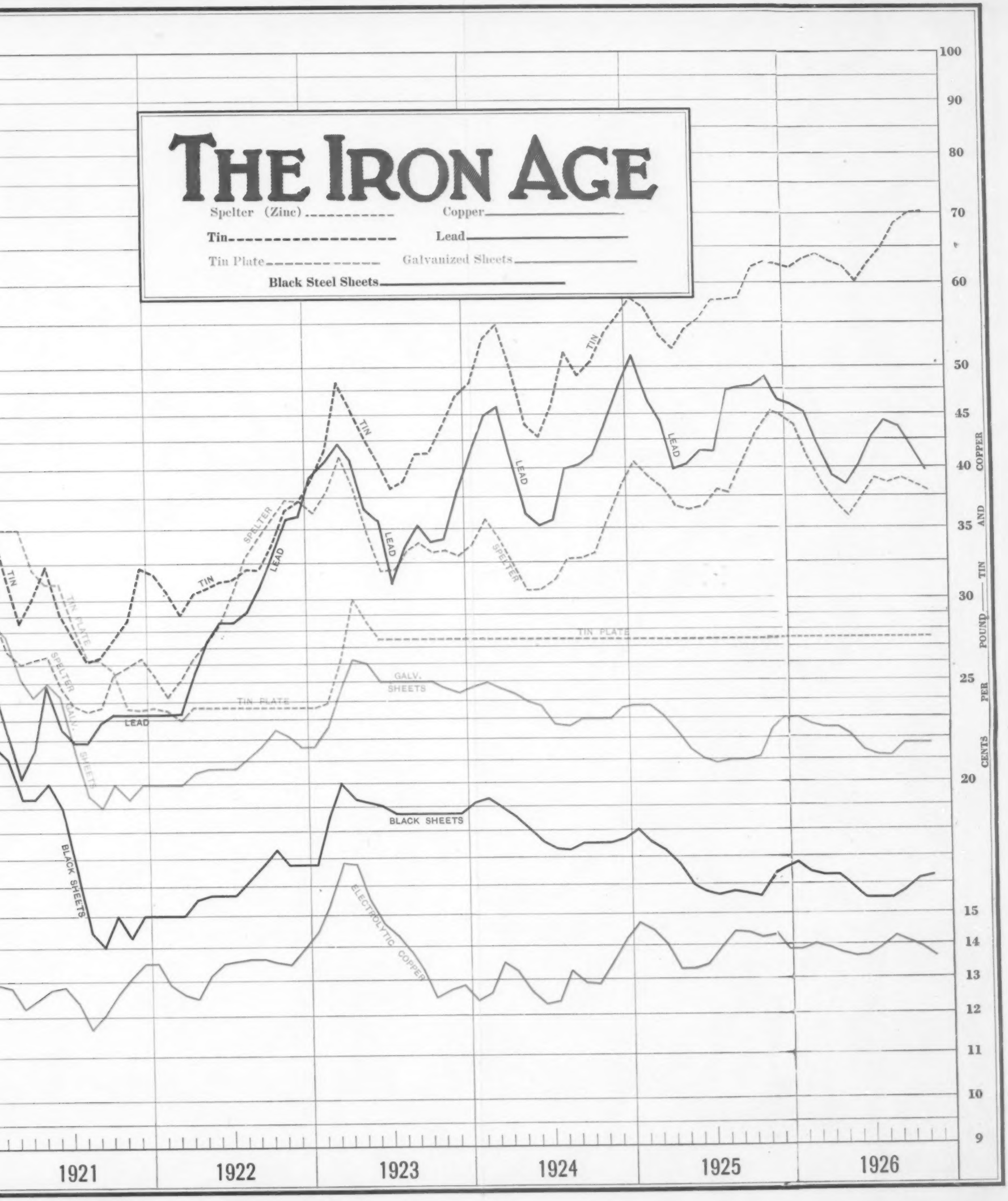
	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
January	3.20	2.90	3.46	2.87	2.79	4.75	6.25	6.25	6.05	5.33	5.70	4.00	4.35	4.98	4.75	4.60
February	3.20	2.87	3.50	2.95	3.16	4.75	6.38	6.25	6.05	6.50	5.56	4.00	4.54	5.00	4.75	4.53
March	3.20	2.80	3.50	2.95	3.40	4.75	6.69	6.25	5.96	7.00	5.05	4.00	4.93	4.93	4.62	4.50
April	3.20	2.86	3.50	2.91	3.29	5.00	7.00	6.25	5.70	7.00	4.88	4.11	5.25	4.88	4.45	4.50
May	3.20	2.90	3.42	2.80	3.50	4.94	8.20	6.25	5.70	7.00	5.00	4.15	5.20	4.80	4.29	4.43
June	3.00	2.90	3.38	2.75	4.28	4.69	9.50	6.25	5.70	7.00	4.88	4.15	5.00	4.76	4.21	4.28
July	3.00	3.00	3.33	2.75	4.40	4.38	10.00	6.25	5.70	8.25	4.31	4.15	5.00	4.56	4.19	4.24
August	2.99	3.12	3.24	2.85	3.71	4.21	10.00	6.25	5.70	9.00	3.90	4.23	5.00	4.55	4.20	4.23
September	2.93	3.21	3.16	2.95	3.56	4.18	9.75	6.25	5.70	8.88	3.81	4.35	5.00	4.60	4.20	4.33
October	2.85	3.36	3.08	2.95	3.50	4.41	....	6.25	5.70	8.18	4.00	4.50	5.00	4.60	4.23	4.35
November	2.85	3.40	2.98	2.88	3.89	5.18	6.25	6.25	5.70	7.04	3.86	4.43	4.93	4.60	4.50	4.35
December	2.89	3.40	2.90	2.78	4.75	6.00	6.25	6.15	5.70	5.70	4.00	4.35	4.89	4.72	4.60	4.35
Average	*3.04*	*3.06*	*3.29*	*2.87*	*3.69*	*4.77*	*7.84*	*6.24*	*5.78*	*7.24*	*4.58*	*4.20*	*4.92*	*4.75*	*4.42*	*4.39*



Carload Prices of Copper, Lead, Tin and Zinc in New



, Lead, Tin and Zinc in New York, and of Tin Plate and Black and



k and Galvanized Sheets in Pittsburgh